Greystoke Land

# West London Technology Park

Proposed hyperscale data centre development
**Updated Scheme**
Iver, Buckinghamshire

# Economic Benefits and Needs Assessment

February 2024

NICOL ECONOMICS

# Contents Page

# 1. Introduction

1.1 In November 2021 Greystoke Land submitted an outline planning application for a data centre development (B8 (Data Centre)) of up to 163,000 sqm (GEA) delivered across 3 buildings at the Woodlands Park Landfill Site land, south of Slough Road in Iver, Buckinghamshire. The capacity of this proposed data centre was the delivery of 147 megawatts (MW) of IT load.

1.2 The application was refused by Buckinghamshire Council in September 2022 and was subject to a Public Inquiry in February 2023 that was determined by the Secretary of State. On 30th October 2023, the Secretary of State issued a Decision Letter refusing the planning permission for the scheme and agreeing with the Inspector's recommendation that the appeal be dismissed. This decision is subject to a separate legal challenge by Greystoke Land.

1.3 Greystoke Land have prepared a revised scheme for a data centre development at Woodlands Park that reduces its footprint and height. The proposed revised development is for:

> "*Outline planning application with all matters reserved except for principal points of access for the redevelopment of the former landfill site to comprise a data centre development (B8 (Data Centre)) of up to 72,000 sqm (GEA) delivered across 2 buildings. The scheme includes site wide landscaping. The data centre buildings include ancillary offices, internal plant and equipment and emergency back-up generators and associated fuel storage. The development will also include cycle and car parking, internal circulation routes, soft and hard landscaping, security perimeter fence, lighting, earthworks, sustainable drainage systems, ancillary infrastructure and a substation*".

1.4 This report addresses the economic benefits that would be generated by the proposed development. It builds on and updates the previous evidence provided on economic benefits and need at the Public Inquiry in February 2023 (Nicol Economics, 2023). The update takes into account:

1) The nature of the revised and smaller scheme and consequent changed economic benefits; and

2) Any significant updates to policy, economic conditions and other factors during 2023.

1.5 At the Public Inquiry there was a Statement of Common Ground between the appellant and Buckinghamshire Council that accepted the level of need for London and for the Slough Availability Zone. The matter of the overall need for data centres in the UK and the Slough Availability Zone (AZ) in particular was accepted by both the Inspector and the Secretary of State.

1.6 The Decision Letter records that the SoS "*agrees that there is a significant and substantial demand for new data centres in the Slough Availability Zone (SAZ), that the provision of data centres would make a significant contribution to the UK economy, and that the appeal proposal would make a significant contribution to this need*" (DLUCH, 2023, para 21).

1.7 The rest of this report consists of the following sections:

- An introduction to the characteristics of and drivers for data centres (Section 2);
- UK policy support and considerations for the proposed development (Section 3);
- A summary of evidence on the current and future need for data centres (Section 4);
- An assessment of the economic benefits from the proposed development (Section 5); and
- Finally, Section 6 sets out overall conclusions.

# 2. Data centres – an introduction

## *The history of data centres*

2.1 Data centres have been around for many years, but their role, until recently, has been localised and business specific. The precursor to modern day data centres were the large servers (or mainframes) that were developed in the 1950s and 1960s. These provided secure data storage for industrial business or organisations in the days before the internet and network computing. Even small firms would have their own server that provided back-up data storage for the data generated within an enterprise. These were, in effect, very small and local data centres. These early data centres were often in a specific part of an enterprise's building, but in some cases were off-site for further security and backup but dedicated to the business.

2.2 When the internet took off in the 1990s and 2000s, the amount of data generated by individuals and organisations started to grow very rapidly, as did the means of internet and digital based communication. Increasingly, organisations across the private and public sectors moved to business models where data and information was shared via intranets that required data to be shared and stored somewhere secure (in what became known as enterprise data centres). In parallel, the development of social media platforms such as Facebook, Instagram, YouTube, Twitter etc led to an explosion in the amount of personal data generated and shared that also had to be stored.

2.3 During the 2000s, cloud computing became commercially available and revolutionised the nature of data centres . Cloud computing is defined as the use of "*pooled, centralised computing resources (including data storage and processing) that are provided to customers on-demand, often over the internet"*[1]. The key revolution was that third party providers were now able to store data for individuals and organisations over or in "the cloud," thereby supporting intranets and business wide platforms rather than this being done in-house. The 'cloud' is something of a misnomer as this data storage actually takes place in data centres located in physical sites on the ground.

2.4 Every time a mobile phone, smart TV or computer user accesses internet services such as search engines, apps, or documents, this requires instant access to the data needed for and associated with these activities. This is as true for an on-line plane or holiday booking service as it is for the NHS App that stores Covid-19 passports or a whole range of cloud-based services from Spotify for music, to BBC iPlayer and Netflix for TV and films. It is also true for document editing and sharing platforms (such as Google Docs) and video conferencing services such as Zoom and Microsoft Teams.

2.5 The data economy and society that we now live in requires **key digital infrastructure** to operate successfully. The UK Government's National Data Strategy (DCMS, 2020 and 2021) describes this as "*the virtualised or physical data infrastructure, systems and services that store, process and transfer data*" and explains that this includes:

- Data centres - providing the physical space to store data;
- Peering and transit infrastructure - enabling the exchange of data (what is sometimes referred to cabling or fibre optic connections); and
- Cloud computing - providing, as noted above, the virtualised computing resources that are accessed remotely.

[1] "Cloud Computing," POSTNOTE Number 629, The Parliamentary Office of Science and Technology (POST), June 2020

## The types of data centres

2.6 There are a variety of types of data centres. The four main types of data centres which feature in the various statistics about data centres are:

- **Enterprise** data centres (that are bespoke to one firm and are a continuation of the earlier forms of data centres). They are owned and operated by the business or organisation (although elements can be provided by a third party provider).
- **Co-location** data centres that are operated by one business but are shared by several firms or groups of enterprises (also called multi-tenant data centres). This approach is sometimes referred to as "retail" colocation. A "wholesale" colocation data centre is where the data centre operator provides the whole data centre to a single third party user (who therefore does not own the data centre) and who might be a provider of cloud computing services.
- **Edge** data centres are small data centres that are located close to the edge of a network. They provide the same devices found in traditional data centres, but are contained in a smaller footprint, closer to end users and devices[2].
- **Hyperscale** data centres are a specific form of data centre used by the tech giants and major cloud and internet service firms and others.

## Hyperscale data centres

2.7 The development proposal that is the subject of this appeal is a site for a hyperscale data centre. It is helpful for purposes of assessing need to understand the concept of hyperscale in more detail. The essential defining characteristic of hyperscale is, as the name suggests, the **size** of the data centre.

2.8 However, hyperscale characteristics relate to more than simply size. They also refer to the ability to scale up, to scale down, and to scale out to meet any data load they service. This can mean adding more computer power, as well as adding more machines, i.e., the ability to "scale out"[3]. Hyperscale data centres are typically owned and operated by one company to serve their needs (e.g., Microsoft, Google or Amazon Web Services). However, they can also be operated by companies like Equinix, CyrusOne and Digital Realty who operate hyperscale data centres and rent out capacity to many large businesses (in effect operating as hyperscale colocation data centres).

2.9 There are different ways that hyperscale size can be defined: the number of servers; the power supply needed; or the floor area of the centre. Others define hyperscale data centres by their functionality[4], rather than any size parameter. There is no single definitive definition of what is a hyperscale as opposed to an ordinary large data centre. Exploring these size parameters in turn:

[2] There is also a variant of edge data centre which is a "portable" data centre that is mobile and can be "lifted and shifted."

[3] Horizontal scaling – known as scaling out, means increasing the machines working in the network. Vertical scaling – or scaling up, adds additional power to the machines already in service. Scaling up/ Down Services & functionality means reduction in service requirement (e.g., reducing from software as a service to just bare infrastructure (SaaS to IaaS). Together this provides the ability to be agile and to scale "on demand" depending on the current and projected demand.

[4] This is the approach used by Synergy Research who track the number of hyperscale data centres.

- Number of **servers**: some definitions of hyperscale suggest that they would need a minimum of 5,000 server racks[5] but more typically they are seen as having 50,000 (or more) computing and storage servers[6].
- **Power capacity**: the typical power consumption/IT load availability in a hyperscale data centre has been described as an average of 20MW to 50MW per data centre[7].
- Size of **site and buildings**: the size of hyperscale data centres buildings depends on data centre configuration. One definition of the very minimum size of a hyperscale data centre is 10,000 sqft of "white space"[8]. This is consistent with the 5,000 servers at one server every two sqft of space[9]. For a 50,000 server rack data centre then the area of white space housing the servers would be 100,000 sqft (around 9,300 sqm), although this is far from being the whole area of the data centre building.

2.10 Hyperscale data centres require very large amounts of power reflecting their large computing capacity and workload. However, modern hyperscale data centres are **very efficient in their use of power** (data storage and usage per unit of power consumed is much higher than older and smaller data centres). The requirements of access to energy, especially green energy, are becoming critical factors in the design and locations of data centres. The data centre industry is taking sustainability very seriously with a major focus on improving the energy efficiency of data centres and processing[10]. This will be given further emphasis by new EU-wide regulations carbon emissions that will impact on environmental standards for data centres. This will impact on data centre operators located in the UK as well as they all to some degree provide services to customers in the EU. . This will replace the current voluntary European Code of Conduct for Energy Efficiency. More details on these drivers are set out in the JLL Technical Note which was prepared for the Public Inquiry in February 2023 (JLL, 2023a).

2.11 Globally the number of hyperscale data centres is growing rapidly (see Figure 2.1). They are accounting for a **rapidly increasing share of all data centre activity**. There are definitional issues around measuring the size of total data centre activity (which can be measured in terms of revenues, data stored or MW of IT load capacity) and that of hyperscale data centres. Some recent research suggests that the global hyperscale data centre market size (i.e., total value of sales) was around $62 billion in 2021 and was forecast to grow at a compound annual growth rate (CAGR) of 29% over the period 2022 to 2030[11]. This is considerably faster than forecasts of the total data storage or data centre market.

[5] International Data Corporation (IDC) defined a data centre as hyperscale when it exceeds 5,000 servers.

[6] AFL Hyperscale "Hyperscale and Other Types of Data Center," May 14, 2020

[7] https://www.aflhyperscale.com/articles/now-thats-interesting/what-makes-hyperscale-hyperscale/

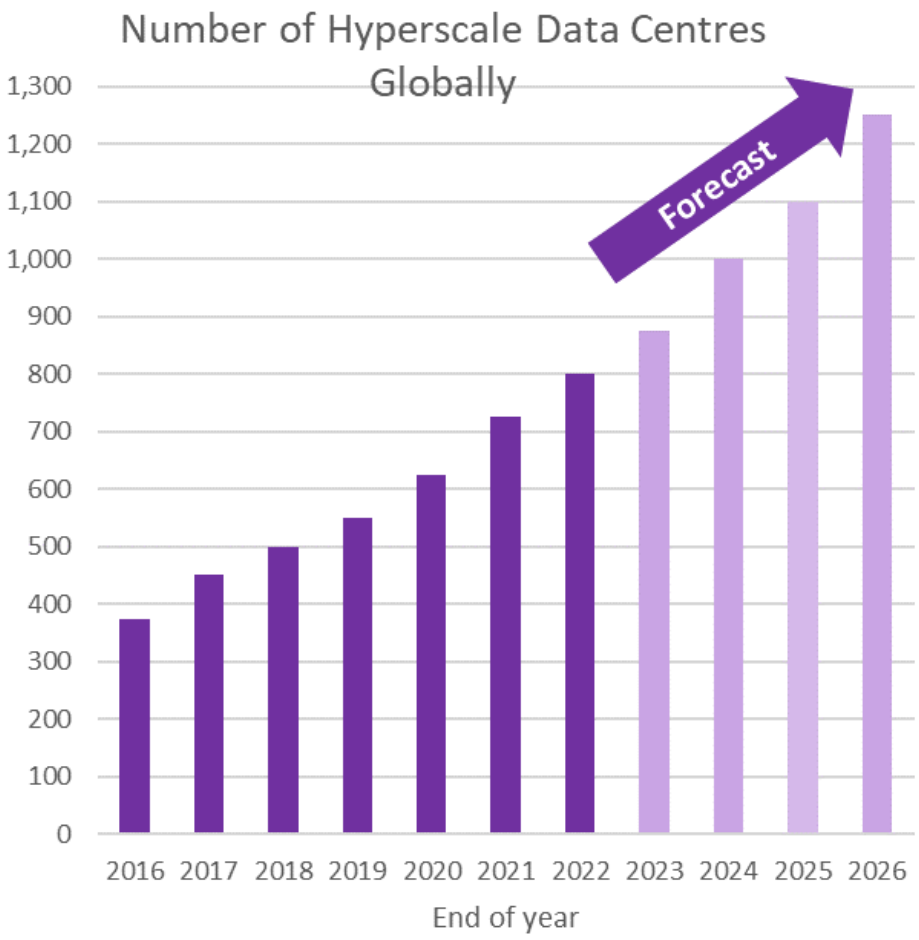
[8] That is the space devoted to the computing elements of a data centre as opposed to power supply etc.

[9] As reported in https://www.zdnet.com/article/how-hyperscale-data-centers-are-reshaping-all-of-it/

[10] The European Data Centre Association (EUDCA) has formed a Climate Neutral Data Centre Pact setting out targets for the sector.

[11] Source: summary of Precedence Research report accessed via the web December 2022

**Figure 2.1: Actual and forecast number of hyperscale data centres globally**




*Source: Nicol Economics analysis of Synergy hyperscale forecasts, March 2023*

## Availability Zones

2.12 Availability Zones (or AZs) are a crucial factor in the location of many data centres especially the hyperscale data centres used by the large cloud services providers. As explained in the JLL Technical Report, these require proximity to existing data centre capacity and connectivity via robust fibre optic cables. The full description is as follows

> "*Comprising of a number of isolated data centres located within specific regions which are all equipped with independent and redundant power, cooling and networking infrastructure all housed in separate facilities. These interconnected data centres provide the platform in which public cloud services originate and operate. Availability Zones typically consist of three data centres configured within a defined radius; this proximity is necessary in order to provide near 100% uptime availability of digital services. Participating data centres in an Availability Zone connect to each other over a redundant, high-speed, low-latency private network link, and all zones in a region connect through the same sort of network links*" (JLL, 2023a, para 2.21(5)).

2.13 Major cloud computing providers, who are the hyperscale data centre owners or users, require to be in a suitable AZ for their operations. As explained in the JLL Technical Report by far the most important AZs in the wider London region are the Slough, Hayes/West Dayton (these two overlap with each other) and to a lesser extent the Docklands AZs (see paras 5.1, 9.6 to 9.23).

# 3. Policy considerations for the proposed development

## *Planning Policies - NPPF and PPG*

3.1 There are no direct references to "data centres" in either NPPF or PPG. That is not surprising given how recently they have become visible in economic terms (unlike telecoms cabling infrastructure for instance). However, there is clear policy support of a more general nature for data centres within NPPF.

3.2 Also as stated in Paragraph 86 planning policies should be "*flexible enough to accommodate needs not anticipated in the plan, allow for new and flexible working practices (such as live-work accommodation), and to enable a rapid response to changes in economic circumstances*". It is undoubtedly the case that the speed with which the need for data centres has occurred is one that requires flexibility and represents a "change in economic circumstances". Such a need could not have been anticipated when the current Local Plan in Three Rivers was being developed, examined and adopted.

3.3 Para 87 of NPPF states that "*planning policies and decisions should recognise and address the specific locational requirements of different sectors*". The list in this paragraph of the NPPF covers storage and distribution but also specifically makes reference to "*making provision for clusters or networks of knowledge and data-driven, creative or high technology industries*". It is clear that data centres are covered by this description and so are given specific support as part of Section 6 of NPPF on "*building a strong and competitive economy".*

3.4 Paragraph 118 considers communications infrastructure which of course covers digital infrastructure. It notes that "*planning policies and decisions should support the expansion of electronic communications networks, including next generation mobile technology (such as 5G) and full fibre broadband connections*" and that "*policies should set out how* ***high quality digital infrastructure****, providing access to services from a range of providers, is expected to be delivered and upgraded over time"* (emphasis added). Although the focus of this policy statement is around mobile technology and fibre connections, it provides clear support for the wider role of all forms of digital infrastructure, which would of course include data centres. We note later on, government data and digital policy make it very clear that data centres are a key part of the UK's digital infrastructure

3.5 PPG provides advice on assessing economic need that is designed for the office, industrial and manufacturing use classes. Data centres are analogous in some respects to physical warehouses as both are forms of storage and data centres are generally classed as B8 uses. However, that is where the analogy really stops. PPG sets out three ways of assessing economic need (para 29)[12]:

- Sectoral and employment forecasts and projections which take account of likely changes in skills needed (labour demand);
- Demographically derived assessments of current and future local labour supply (labour supply techniques); and
- nalysis based on the past take-up of employment land and property and/or future property market requirements.

[12] Paragraph: 029 Reference ID: 2a-02920190220

3.6 The first two, for obvious reasons, are not applicable to data centres. The last one, which might be styled "market signals," is relevant to data centres. It is also worth pointing out that PPG focusses in the main on the need for local businesses and the local economy. It does not provide guidance on where there is a national level need driving property demand. However, this is where there is an analogy with what PPG describes as "*strategic [logistic] facilities serving national or regional markets*"[13]. Here it advises strategic policy-making authorities to help determine need: to engage with "*developers and occupiers to understand the changing nature of requirements in terms of the type, size and location of facilities*;" to undertake an "*analysis of market signals";* and carry out an "*analysis of economic forecasts*".

## UK Economic Policy

### *General economic growth and support for digital sectors*

3.7 The importance of the digital economy, tech sectors or digital sectors is a very strong thread that runs through all recent significant economic policies and plans from government. To summarise:

- In 2017, the government published the White Paper on a new national **Industrial Strategy** (HM Government, 2017)). This strategy identified as one of four "Grand Challenges" the need to put the UK at the forefront of the "*Artificial Intelligence (AI) and data revolution*." The Strategy noted that the "*data driven economy*" is typified by "*a digitally connected economy that realises significant value from connected, large scale data that can be rapidly analysed by technology to generate insights and innovation*."
- The Industrial Strategy was updated during 2021 by the new **Plan for Growth** (HM Treasury, 2021). One of the three pillars of growth for the UK was innovation. Here the Plan emphasised the importance of "*backing the sectors and technologies that will shape the UK's future*" and stated that "*the digital and creative industry sectors are a major success story for the UK, and a critical driver of innovation and growth. We will work to ensure that these sectors can flourish by nurturing a safe, fair and open digital economy, growing more creative businesses around the country and building on our advantages in foundational technologies like AI, quantum computing and digital twins, including through the National Data Strategy and upcoming Digital Strategy*."
- The 2022 **Autumn Statement** from HM Treasury emphasised the importance of boosting UK economic growth rates and that states that "*the government will ensure that those sectors which have the most potential for growth - such as **digital**, green technology and life sciences - will be supported through measures to reduce unnecessary regulation and boost innovation and growth*" (page 3, emphasis added).
- The March 2023 Budget stated again that the UK's: *"digital, life sciences and creative sectors are amongst the largest in the world. The UK is on track to become a world leading science superpower, supported by the newly established Department for Science, Innovation and Technology*".

### *Inward investment and trade*

3.8 The Department for International Trade (DIT) published a policy paper on digital trade in September 2021 (DIT, 2021c). This paper noted that digital trade allows British businesses to share the benefits of prosperity by:

[13] Paragraph: 031 Reference ID: 2a-031-20190722

- reaching a wider consumer base by selling online;
- trading more efficiently and cost-effectively by streamlining shipping, logistics and other trading processes; and
- connecting and growing their workforce across different regions of the world.

3.9 The paper also notes that: "the ability to connect digitally alongside more traditional methods also makes the supply of services more resilient to disruption."

3.10 DIT recently released data on inward investment into the UK for 2021/22 (DIT, June 2022). This data showed a total of 1,589 projects supporting 84,759 new jobs, 7,755 safeguarded jobs and an economic value of over £7 billion. Of relevance, is that nearly a third (29%) of the inward investment (as measured by number of new jobs) was in the digital sector (software and computer services and electronics and communications). The majority of other projects were in sectors of the economy with a high level of digital content/usage (such as biotechnology, creative and media, financial services etc).

3.11 A review of the DIT website[14] setting out investment opportunities within the UK, shows there are around 30 individual sectoral opportunities. Of these, at least half are ones that have a very strong data/digital linkages and/or level of usage (eg augmented reality and virtual reality, cyber security, edtech, financial services, fintech, medical technology, professional and business services, technology etc). This emphasises the importance of the future of the UK economy in respect of the data/digital sector.

3.12 The letter sent by the then Department for International Trade (DIT) to Buckinghamshire Council on 9th January 2023 (DIT, 2023) specifically references the importance of attracting investment in these key sectors and the related role of data centres (that are also set out in the DIT's data centre "proposition" for inward investors).

3.13 It describes data centres being:

> *"at the heart of the UK's digital infrastructure and represent the focal point where HMG's Industrial Strategy and the Digital Strategy meet. The UK is a globally important data centre market (holding 6% of the world market share), home to the largest data centre market in Europe (holding around 25%+ of market share) and the world's second-largest commercial cluster."* and that …" *The Government's National Data Strategy and National Cyber Strategy recognises the vital and growing role of digital and data in the UK economy and has identified the need for a secure and reliable digital infrastructure to ensure the smooth functioning and to maximise the growth prospects of the economy. Data centres are a critically important part of that digital infrastructure".*

3.14 In location terms the letter states that: "*there is strong growth in the demand for data centre capacity to support the UK economy itself. As a direct result of this identified need, there is a sustained demand for sites across a corridor that includes Berkshire, Buckinghamshire, Hertfordshire, and west London*

[14] https://www.great.gov.uk/international/content/investment/sectors/

## UK Digital Strategy

3.15 The UK Government's specific digital ambitions are set out in the UK Digital Strategy. This was originally published in May 2017 (before the Industrial Strategy White Paper). A new version of the strategy was launched in June 2022 (DCMS, 2022). This sets out six overall priorities and 24 sub-priorities (that are summarised in Box 3.1):

| Box 3.1: UK Digital Strategy, 2022 | |
|---|---|
| 1/ Digital foundations | 1.1 World class and secure digital infrastructure<br>1.2 Unlocking the power of data<br>1.3 A light-touch and pro-innovation regulatory regime<br>1.4 Security and the digital economy |
| 2/ Ideas and intellectual property | 2.1 Supporting universities to develop new ideas and technologies<br>2.2 Incentivising businesses to innovate<br>2.3 Innovation in the NHS |
| 3/ Digital skills and talent | 3.1 Strengthening the digital education pipeline<br>3.2 Increasing awareness of pathways into digital occupations<br>3.3 Developing advanced digital skills<br>3.4 Lifelong digital skills<br>3.5 Collaborating with the private and third sector on digital skills<br>3.6 Attracting the brightest and best globally |
| 4/ Financing digital growth | 4.1 Seed investment<br>4.2 Early stage and scale-up investment<br>4.3 Making the UK the global tech IPO capital |
| 5/ The whole UK: spreading prosperity and levelling up | 5.1 Supporting the UK's businesses through digital adoption<br>5.2 Improving public services<br>5.3 Supporting access to public procurement opportunities<br>5.4 Levelling up our regional economies<br>5.5 Supporting net zero |
| 6/ Enhancing the UK's place in the world | 6.1 Global leadership: Governance and values<br>6.2 Promoting digital exports and inward investment<br>6.3 Achieving our priorities through international partnerships |
| *Source: DCMS, 2022* | |

3.16 As well as showing the breadth and importance of the digital sector to the economy and society the digital strategy also highlights the importance of data centres in several areas:

- As part of ensuring a "world class and secure digital infrastructure" (1.1); and
- To help promote digital expertise and attract inwards investment (6.2) (of which the proposed WLTP data centre would be an example).

## UK National Data Strategy

3.17 The aim of the National Data Strategy (NDS) is: "*to drive the collective vision that will support the UK to build a world-leading data economy*." It is an evolving strategy that was started in June 2019 with a "call for evidence", leading to publication of a consultation draft in September 2020 which was updated in December 2020 (DCMS, 2020 and 2021).

3.18 This strategy includes a clear acknowledgement of the role of data centres in supporting the digital economy and the UK economy. The strategy sets out five priority areas of action for government (or "missions") which are:

1) Unlocking the value of data across the economy;

2) Securing a pro-growth and trusted data regime;

3) Transforming government's use of data to drive efficiency and improve public services;

4) Ensuring the security and resilience of the infrastructure on which data relies; and

5) Championing the international flow of data.

3.19 The fourth mission is of very particular relevance to this project. The government states here that:

> "The use of data is now a central part of modern life, so we need to make sure that the infrastructure underpinning it is safe and secure. **The infrastructure on which data relies is a vital national asset that needs to be protected from security risks and other concerns, such as service disruption. Interruption to data-driven services and activities can cause disruption to businesses, organisations and public services**. While these are also commercial risks to manage, the **government has a responsibility to ensure that data and its supporting infrastructure is resilient in the face of established, new and emerging risks, protecting the economy as it grows**." [emphasis added[15]]

3.20 The NDS specifically notes that the: "infrastructure on which data relies is the virtualised or physical data infrastructure, systems and services that store, process and transfer data. This includes **data centres (that provide the physical space to store data)**, peering and transit infrastructure (that enable the exchange of data), and cloud computing that provides virtualised computing resources (for example servers, software, databases, data analytics) that are accessed remotely." [emphasis added, page 23].

3.21 The government consulted on the NDS between September and December 2020; in May 2021 it published its response to the consultation (DCMS, 2021). The response states that the "*consultation feedback has confirmed that the framework we set out in the National Data Strategy is fit for purpose and that we must now take action to ensure that we make the most of data's many opportunities*." A number of points were made in respect of data centres in the response:

- The importance of considering the environmental footprint of increased data use, for example the carbon emissions generated by data centres.
- Also, the importance of the government's role in ensuring the security and resilience of the data infrastructure was highlighted in the consultation responses. The government's response to this point noted that critical staff working in data centres had been "*granted key worker status, demonstrating the importance of the sector and its maintenance*" (page 19).

## *UK National Cyber Strategy*

3.22 The National Cyber Strategy (NCS) was published in February 2022 (HM Government, 2022). The purpose of this strategy is to set out the Government's "*plan to ensure that the UK remains confident, capable and resilient in this fast-moving digital world; and that we continue to adapt, innovate and invest in order to protect and promote our interests in cyberspace*." The NCS was of course prepared against a backcloth of increase cyber-attacks globally by hostile states and criminal actors and so concerns about UK security as well as cyber security at the level of businesses and individuals.

[15] Note: as the document was published in html format there are no page or paragraph numbers, but when downloaded this appears on page 5

3.23 The NCS vision for the UK in 2030 is that it "will continue to be a leading responsible and democratic cyber power, able to protect and promote our interests in and through cyberspace in support of national goals" (para 5, page 11). There are four national goals (page 11) which are described as:

1) A more secure and resilient nation, better prepared for evolving threats and risks and using our cyber capabilities to protect citizens against crime, fraud and state threats;

2) An innovative, prosperous digital economy, with opportunity more evenly spread across the country and our diverse population;

3) A Science and Tech Superpower, securely harnessing transformative technologies in support of a greener, healthier society; and

4) A more influential and valued partner on the global stage, shaping the future frontiers of an open and stable international order while maintaining our freedom of action in cyberspace.

3.24 The NCS makes a number of points relevant to data centres:

- First it emphasises the rapidly increasing importance of digital and cyberspace to all aspects of life "*exponential advances in technology combined with decreasing costs have made the world more connected than ever before, driving extraordinary opportunity, innovation and progress*." It notes that "*the coronavirus (COVID-19) pandemic has accelerated this trend, but we are likely still in the early stages of a long-term structural shift" …. "cyberspace is now integral to our future security and prosperity*" (Para 1, page 10).
- Second, it highlights the opportunity but also dependency that this creates. In drivers for change it notes that "*the coming decade will see the continued rapid expansion of data and digital connectivity to almost every aspect of our lives. Huge global growth in Internet access and usage, underpinned by data and the infrastructure upon which data use relies, is creating new markets and increasing convenience, choice and efficiency. But it also makes countries much more dependent on interconnected digital syste*m" (para 33, page 29).
- Third, as with the NDS it emphasises the importance of ensuring that "the infrastructure on which our data use relies is **secure and resilient**. This infrastructure is a vital national asset – one that supports our economy, delivers public services and drives growth," we *will take a greater role in ensuring that data is sufficiently protected when processed, in transit, or stored at scale, for example in external data centres*." (Para 111, page 71, emphasis added).

## *Conclusions*

3.25 There is much that can be drawn from this review of government policy that is highly relevant to the importance of data centres:

1) First, the recognition of the importance of the digital economy to UK prosperity and effective functioning of our public services, government and society.

2) Second, further recognition that this role is becoming ever more important, presenting great opportunities and also challenges.

3) Third, the importance of a secure and reliable digital infrastructure to ensure the smooth functioning and to maximise the growth prospects of the economy.

4) Fourth, a recognition that data centres are a critical important part of that digital infrastructure.

# 4. Evidence on current and future need for data centres

## *Drivers for the need for data*

4.1 The JLL Technical Note (2023) sets out a range of information on the past and forecast growth in data usage and storage. This section focuses on the links from data centres to economic activity.

## *Relationship between data and the economy*

4.2 The growing importance of data to businesses is being driven by several mechanisms, with potential for overlaps between them[16]. The mechanisms are:

- **Improved business intelligence and decision-making.** The generation of ever greater volumes of data provides the potential for the development of more detailed insights into a wide range of issues and challenges facing businesses. These include better insights into customer behaviour and market trends; more efficient procurement and management of supply chains and inventories; improved environmental performance; more cost-effective compliance with labour market, environmental and other forms of regulation; and better identification and management of business threats and risks.
- **Cost-efficiencies and revenue growth**. In sectors such as manufacturing and construction, efficiencies can be achieved through better procurement, better utilisation of machines and vehicles, and the identification and elimination of wasted resources and energy used in production.
- Opportunities for **product and service innovation** and related opportunities for new business creation.

### Value of the data economy

4.3 The UK government, as shown earlier, acknowledges the importance of the "data economy"[17]. There are a variety of ranges of estimates of the importance of the overall UK "data economy" that have been produced, using different definitions and methodologies (see Box 5.1). The two approaches used actually produce estimates that are similar in their orders of magnitude at around 4% of the UK economy. In both cases the research finds that this is a proportion that is growing fast. A review of these data sources for DCMS[18] concluded that the evidence "*is backed by both primary research (market surveys) and publicly available statistical data*." However, the review noted that the data used was "outdated" and that its validity "*depends wholly on the definition of 'Data Economy' used".* The review noted that actual value of the UK data economy in 2016 may have ranged somewhere between £61 billion and £73 billion (a £12 billion difference), and that this value could be considerably different in 2019.

[16] Drawn from the "Data Economy Report," Digital Realty, May 2018

[17] DCMS define the digital economy as "*economic activity featuring digital technologies, and changes to market activities based on the influence and changes digitalisation brings*". They note that the term "*data economy, while more specific, is often used interchangeably, and covers the direct, indirect, and induced effects that the use and selling of data has on the economy as a whole. It involves the generation, collection, storage, processing, distribution, analysis elaboration, delivery, and exploitation of data enabled by digital technologies*". DCMS (2020)

[18] National Data Strategy: Review of commonly quoted statistics, Policy Lab, June 2019

**Box 4.1: Definitions and estimates of the data or digital economy**

Estimate 1. The "**data economy**" here is defined as the economic value created by the storage, retrieval and analysis - via sophisticated software and other tools - of large volumes of highly detailed business and organisational data at very high speeds [1]. This analysis calculated that the overall value of the data economy in the UK in 2016 was around £73 billion or 4.2% of total GVA. It was estimated to have grown from £55 billion or 3.6% of the economy in 2012.

Estimate 2: The "**data market** "is the marketplace where digital data is exchanged as "products" or "services" as a result of the use of raw data. The work defines its value as the aggregate value of the demand of digital data without measuring the direct, indirect and induced impacts of data in the economy. The value of the data market includes imports (data products and services bought on the global digital market from suppliers not based in Europe) and excludes the exports of the European data companies [2].

Estimate 3: The "**data economy"** is measured by the overall impacts of the data market on the economy. It involves the generation, collection, storage, processing, distribution, analysis elaboration, delivery, and exploitation of data enabled by digital technologies. The data economy also includes the direct, indirect, and induced effects of the data market on the economy [2]. In 2020 this is estimated at around £79 billion or 4.2% of UK GDP. The data economy has been growing at a much faster rate than GDP and is forecast to rise to between 5.4% to 7.8% of GDP by 2025

*Sources: (1) Development Economics, commissioned by Digital Realty in "The Data Economy Report 2018"; (2) European Commission (2020), The European Data Market Monitoring Tool, Key Facts & Figures, First Policy Conclusions, Data Landscape and Quantified Stories, D2.9 Final Study Report, 2020*

4.4 There have been several other attempts made to value the data or digital economy (or parts of it such as "big data"). The challenge faced by any estimate is the fact that the use of data is now so interwoven in the fabric of the economy that it is very hard to disentangle the role it plays in economic value creation (alongside all the other factors). There are two basic ways of measuring the value of the "data economy":

- First, by the value of the economic output of the sales of goods and services of the sector (the Gross Value Added or GVA it creates); and
- Second, by the role provision of data services and analysis plays in aiding the creation of economic value across the whole economy.

4.5 The first approach can be measured in a broad brush way by the economic output of the three sectors that most closely correspond to the provision of services for the data economy. These are: "telecommunications", "computer programming and consultancy" and "information services" (see Table 4.1 below).

4.6 In 2019, which is the latest year for which robust, pre-Covid data is available, the total economic output of these three sectors was **£101 billion** or 5.1% of total UK GVA. The largest contribution is from "computer programming and consultancy" (covering all forms of software services) followed by telecommunications. The whole ICT sector (also covering publishing and media as well) generated **£137 billion** in GVA or 6.9% of the UK total. The activities of data centres, if they are separated out from wider business activity (e.g., colocation data centres), would fall within SIC 63 "information services", whose economic output was **£10.4 billion** in 2019.

| Table 4.1: Sectoral definitions covering the provision of data related services | |
|---|---|
| Standard Industrial Classification code | Sector name |
| 61 | Telecommunications |
| 62 | Computer programming and consultancy |
| 63 | Information service activities |
| **All above** | **Data economy provision sectors** |
| 58 | Publishing activities |
| 59 | Motion picture, video and TV programme production |
| 60 | Programming and broadcasting activities |
| **All 58 to 63, Section J** | **Information and communication (ICT) sector** |
| *Source: UK Standard Industrial Codes (2007), ONS* | |

4.7 Important data activities are of course in some case carried out **in-house** by business (enterprise data centres for instance or in-house IT departments). In these instances, the economic activity associated with them would be captured in other sectors of the economy and not by these figures.

4.8 There have been various attempts to estimate the value of the role data can and will play in the UK and global economy which we have reviewed. These estimates include ones that suggest:

- Data will benefit the UK economy by up to £241 billion between 2015 and 2020[19]; and
- Global GDP will be up to 14% higher in 2030 as a result of the accelerating development and take-up of AI[20].

4.9 The task of trying to put an estimate on the value of data for the UK economy is becoming an increasingly difficult and, arguably, a pointless exercise. It is rather like trying to assess the value of the transport or the energy supply infrastructure. These are components of **critical infrastructure** that support the whole economy and if the infrastructure is not adequate this will both constrain the economy and the effective functioning of society (as recent events have shown). However, in contrast to more traditional forms of infrastructure, the role of the digital/data infrastructure is becoming increasingly more important as the whole way our society and economy functions is changing.

4.10 We have reviewed the most recent statistical and economic evidence on the importance of data to different sectors of the economy. This has been done by assessing the relative importance of purchases of data/digital services (in their broadest sense) by different sectors of the UK economy (see Figure 4.1). The sectors shown in the figures all have above average shares of purchases[21] compared to the all sector average (of 4.3% of inputs being these digital related services). This is an indicator of the relative importance of data and digital services to these sectors. The analysis shows:

- The key importance of data to the financial services sector and the professional services sectors (legal, accountancy etc).
- The importance to head offices and management consultancy.

[19] CEBR (2016) as quoted in the UK Government Digital Strategy 2017 (DCMS 2017)

[20] "Sizing the prize, PwC's Global Artificial Intelligence Study: Exploiting the AI Revolution" PwC, September 2017

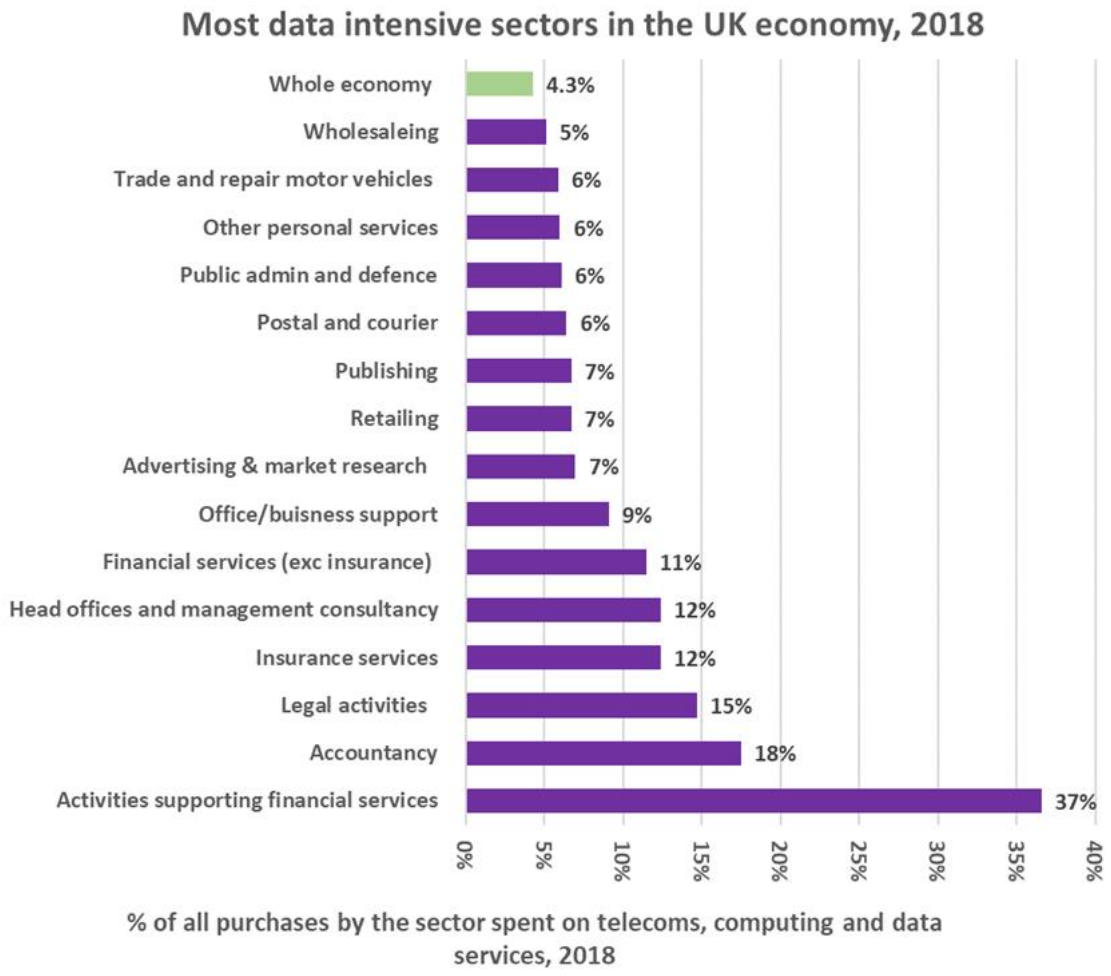
[21] We have of course excluded the data/digital sectors themselves.

- The importance to publishing and advertising and market research (covering parts of the creative sector).
- The importance to retailing and to a lesser degree wholesaling and sales of motor vehicles (where data and access to data is becoming more important all the time).

4.11 Many of these sectors are critical to the future success of the UK economy and account for a large share of UK exports. In 2019, the ICT sector and the professional and businesses services sector accounted for £104 billion in exports from the UK and had a net balance of trade of £47 billion. This represents 15% of all UK exports and 33% of all UK services exports[22].

4.12 The following data is for 2018, the most recent year for which reliable data is available, shows the importance of data-related activity to a wide range of economic sectors. By 2023 (ie five years later), we would expect the overall amount spent on digital/data services to have risen (as a measure of importance), but the broad pattern of concentration by sectors to have remained the same.

**Figure 4.1: Assessment of most data intensive/data using sectors of the economy in 2018**




*Source: Nicol Economics analysis of ONS Supply and Use Tables, 1997 – 2018, October 2020*

[22] Nicol Economics analysis of UK Trade Statistics (International Trade in Services, 2019, ONS, January 2021) and UK Trade in Numbers, Department for International Trade, February 2021

4.13 The JLL Technical Note (JLL, 2023a) set out some of the technological and other drivers that are increasing the demand and need for data globally and in the UK. These drivers are also well documented in the various government strategies covered in the previous section. In summary they include:

- The rise of **cloud computing** where data and applications are held in the "cloud" and accessed by workers and individuals remotely using applications and data stored in data centres.
- The growth of the **Internet of Things** (the increase in the use of connected devices and the proliferation of smart sensors and meters), the move to smart technologies (including in the future driverless cars etc).
- The rise of **data analytics** (or sometimes called Big Data) requiring the analysis of large and very complex data sets.
- The rapid growth of **Artificial Intelligence/Machine Learning** which requires very substantial levels of computer processing power. The very recent arrival of ChatGPT and other "AI chatbots" has and will rapidly transform demand for a whole new host of digital services. It is also true that the use of AI in data centres will help them become more efficient.

4.14 These trends are impacting on all sectors of the economy and parts of society. Hence, access to data is becoming increasingly essential for a successful and effectively functioning economy.

## *Drivers for the location of data centres to meet societal and business needs*

4.15 The growth in data centres is responding to the economic, societal and technological drivers. We cover below where additional data centre capacity needs to be located to meet this rapidly growing need.

### *At a country level*

4.16 Data centre capacity growth globally has been driven by where the major centres of economic activity in the most data hungry sectors are located. The greatest concentration of data centre capacity and of hyperscale data centres is the USA, and within the US is in Northern Virginia. At a European level, there are five well-established central data centre hubs: Frankfurt, London, Amsterdam, Paris and Dublin (sometimes called FLAP-D).

4.17 There are several logical reasons why these cities/countries have become the centre of gravity for data centres in Europe: their large populations, their prime and large business districts, being major financial hubs and locations for large corporate organisations, and availability of utilities, technology and transportation[23]. These five cities represent the top five locations in Europe for business and data centres in terms of scale, number of data centres, MW of IT load and high-speed network connectivity. Within this group, London has been the pre-eminent location for data centres, driven by its critical economic and business base.

[23] The exception to this is Dublin, it has become a major centre in large part because of its location facing the US and main Atlantic fibre cables and acts as a landfall/first point of storage for data transition between the USA and Europe

4.18 There are also specific **legal** and **security** requirements that drive the need to have UK-based data centres to hold data for UK businesses and residents. These are explained in a recent report on European data centres by Savills[24] and are expanded on in the JLL Technical Report (JLL, 2023a). There are three interrelated but different concepts:

- **Data residency** is where a business or other organisation specifies that their data is stored in a specific geographical location of their choice for policy reasons.
- **Data sovereignty** refers to the country's laws on where data is stored. In the EU, the General Data Protection Regulation (GDPR) law became applicable to all member states in May 2018 including the UK[25]. The GDPR provides for the free flow of non-personal data within the Union to enhance the competitiveness of its digital economy. Importantly, it also allows for the flow of data to third party countries if the receiving country's laws comply with the GDPR's rules.
- **Data localisation** is the most stringent concept of the three. It refers to legal obligations requiring that data created within a country's borders remains in situ and does not travel outside the jurisdiction.

4.19 There was concern, post-Brexit, that the UK and EU would not be able to agree on data protection and security equivalence arrangements (meaning that UK based data centres could not necessarily house data from the EU and vice versa). However, in June 2021 the EU and the UK agreed data equivalence (or a data "adequacy agreement")[26] and this has removed this immediate concern for data centres and other sectors of the economy in the UK and the EU. However, the new adequacy agreement has a sunset clause and so will need to be renewed after four years (ie 2025).

4.20 UK government concerns over cyber security are likely to see requirements to ensure that data pertaining to critical infrastructure is held (and processed) in the UK to ensure that data security considerations can be applied to this data and the companies holding it. The push in the National Cyber Strategy (HM Government, 2022) to increase the resilience and security of data really requires that this data be stored in the UK's jurisdiction otherwise the UK legal framework will not necessarily apply.

4.21 These drivers collectively mean that there are large elements of data pertaining to the UK economy and UK society that do and will need to be **stored within the UK** in UK-based data centres. DIT point out that these security/privacy factors will "*drive cloud service providers to store their personal data **within the country** in order to avoid or mitigate against unauthorised access and manipulation of critical data infrastructure*" (DIT 2021(a), page 5, emphasis added).

[24] Savills (2020)

[25] The UK has, in effect, translated GDPR into UK law.

[26] https://www.gov.uk/government/news/eu-adopts-adequacy-decisions-allowing-data-to-continue-flowing-freely-to-the-uk and https://ec.europa.eu/commission/presscorner/detail/en/ip_21_3183

### *At a city level*

4.22 The drivers for location **within** a country vary by type of data centre but are similar to those at a country level (apart from specific data security or sovereignty/residency requirements and latency/availability zones which are discussed later). A useful techUK report explores the role of London and notes, "*London is a key factor in the success of the UK data centre market*" (techUK, 2020). It also notes that London is dominant in Europe as it is the major global financial and business centre and the data centre sector has benefited from the presence of "*demanding customers*", which led to a co-evolution in technical and operational capabilities. The fact that London has a world class financial sector and a world class data centre industry is no coincidence. In terms of speed and bandwidth, London also has diversity in its offerings – multiple suppliers and options for all business models in a truly competitive market.

4.23 TechUK attributes London's pre-eminence within the UK (and Europe) overall to three things ("age", "beauty" and "experience"):

- *Age*: the **first mover advantage** where by being first, London attracted key players and around them a complex ecosystem supporting data centres has developed. As the JLL Technical Note shows (JLL, 2023a), this has also led to the de-facto creation of "availability zones" due to the pre-existing clustering of data centres.
- *Beauty*: the attractiveness of London for **investors and for skilled staff** seeking a career in the sector.
- *Experience*: the report highlights London's **world class expertise** in investment, finance, design, engineering, construction, technical brokerage, procurement, compliance and energy management.

4.24 Outside London in the UK, the next main centre for data centres is Manchester or "Manchester and the North". In 2021 Knight Frank identify 50 data centre properties with 74 MW of built capacity, 5 MW under construction and 55 MW planned or 134 MW total capacity In this area, (Knight Frank, 2021a). To put this in context this was **just 8% of the capacity of the London market**. In the Manchester area, the average size of the data centres is also much smaller (25% of the average size of those in London). The 5 MW under construction in Manchester was just 3% of the amount under construction in London. In the Manchester market area, enterprise data centres are much more significant in relative terms than colocation data centres (33% of all capacity compared to just 7% for London) reflecting the different nature of the market there.

4.25 Locations outside London do and will have a role to play in providing data centre capacity for the UK (for instance is respect of data centres focussing on back-up). However, they are not attractive to large hyperscale data centres wishing to locate in the UK. So, although it would be desirable in terms of the wider levelling up policy agenda, there is **no prospect of a large scale data centre such as the proposed development locating outside the London area**. The development of data centre capacity in the UK has been, is and will continue to be **entirely market driven.** The UK government does not plan to direct where data centres locate or itself support or set up data centres. Therefore the development of capacity in the UK has to work with market drivers and commercial considerations.

4.26 In this regard the contents of the previous letter from Stack/IPI Partners to Greystoke (October 2022) are highly relevant. This letter identifies London and West London as a "premier location to invest" and sets out the locational drivers for their investment.

4.27 The DIT data centre proposition document (DIT, 2021a), although selling the whole UK, identifies very clearly the benefits of location in London (and the South East[27]) related to:

- Access to the largest labour pool of talent (page 14);
- The concentration of Internet Exchange Points in London (7 out of the UK's 16); and
- The range of specific local strengths of London as a location (page 34).

4.28 Finally, the DIT letter to Buckinghamshire Council (DIT, 2023) highlights that "Thames Valley is central to the UK's data centre landscape, supported by a 21st century digital infrastructure necessary to support data centres, complete supply chains" and that there is "sustained demand for sites across a corridor that includes Berkshire, Buckinghamshire, Hertfordshire, and west London".

### *At a local level*

4.29 The specific local site-specific locational drivers for hyperscale data centres are set out in the previous JLL Technical Note (JLL, 2023a) and are not covered in this report.

## *Future data centre capacity need*

4.30 It is obvious from the assessment by the UK government of the vital and growing importance of data to the UK economy (see section 3 earlier) and from the summary above about economic and societal drivers that there is and will be a rapidly growing need for data centre capacity to meet these needs. It is also clear that the great bulk of this need will have to be met in the wider London area. There is inevitably a degree of uncertainty about the precise rate of growth of demand in the future. The earlier work Nicol Economics carried out in 2021 reviewing evidence (Nicol Economics, 2021) showed that past capacity growth and estimates of European-wide or global growth were running at around 20% pa (for all data centre capacity or for co-location data centres).

4.31 An up-to-date assessment of the need for data centres was carried out for the Inquiry in February 2023 into the previous WLTP scheme and was summarised in the JLL Technical Note (JLL, 2023a). This suggests that the overall demand for data centre capacity in London, largely for hyperscale use, could increase by between 2,250 MW to 3,100 MW over the six years 2022 to 2027 inclusive (this is the cumulative extra capacity) and 2,040 MW to 2,800 MW over the five years 2023 to 2027.

4.32 The rate of growth of capacity needed that is forecast is, after 2023, around 20% each year. This is in line with global forecasts of the growth in data storage needs and the actual growth in overall data centre capacity (colocation) in London. The JLL Technical Note also suggests that the share of overall hyperscale capacity in London which would be needed in the combined Slough and Hayes Availability Zone (AZ) is around 65% of the total future need (based on historical take-up and market evidence of interest).

4.33 It is important to note that the selection of the forecasting period to 2027 does not indicate that growth will stop or slow down beyond this period. Rather five to six years is a typical horizon for forecasting property needs. It is also worth noting that since these forecasts were produced in early 2023, the explosion in use of AI as evidence by ChatGPT and other AI chatbots using Large Language Models (LLMs) is likely to have further pushed up demand for data centre capacity and usage.

[27] For reasons of government policy, the strengths of each of the UK regions is highlighted in DIT 2021a, but from a market perspective for a US tech company for instance the areas around London are effectively part of London in its widest sense (so there is little practical distinction between London and the South East)

4.34 Since the Inquiry was completed there have been some announcements of extra data centre supply that will be delivered, but this is nowhere near meeting these levels of need for London as a whole or, critically, for the Slough/Hayes AZ area.

## UK economic position and current prospects

4.35 The proposed development and its economic boost, which is very substantial, needs to be set against the current state and prospects for the UK economy. These are, as has been widely reported, particularly poor at present. Due to a combination of factors[28], the UK is entering a period of recession with growth prospects for the next few years being particularly poor by historic standards (and compared to our international competitors). The Office for Budgetary Responsibility (OBR) report (OBR, 2023b) that accompanied the 2023 Autumn Statement set out that, taking account of the impact of the measures in the Statement, the UK is expected to see:

- Real GDP growth slowing from 4.3% in 2022 to 0.6% in 2023, and 0.7% in 2024 and the long term growth rate has been reduced from 1.8% to 1.6% per annum.
- Living standards, as measured by real household disposable income per person, are forecast to be 3.5% lower in 2024-25 than their pre-pandemic level.

4.36 There is in imperative to find ways of boosting economic growth in the short and medium term, not least because this will help increase tax revenues and so the sustainability of the UK's public finances.

## Conclusions

4.37 There are several key conclusions that can be drawn from this review of need and location drivers:

1) First , the role and importance of data in the economy is growing rapidly.

2) Second, data now underpins almost every area of the UK economy and its importance is concentrated in key sectors of UK economy that are central to its growth prospects (the digital sector of course, but in particular, financial services, professional and business services, creative/media and head office functions).

3) Third, there are specific needs why data centre capacity needs to grow to meet the needs for data that is stored for UK users in the UK.

4) Fourth, there are strong locational drivers as to why data centres are clustered in and around London. Other UK locations have a role to play but not for large scale increases in capacity. London is where the majority of future data centre capacity for the UK economy will need to be located, given that the provision of data centre capacity is market driven.

5) Fifth, forecasts for future needs for hyperscale data centre capacity indicate that across London this could be between 2,250 MW to 3,100 MW over the six years 2022 to 2027 inclusive (this is the cumulative extra capacity) and 2,040 MW to 2,800 MW over the five years 2023 to 2027.

6) Finally, the UK economy is in a period of recession and faces a period of sluggish economic growth according to the latest forecasts when new investment sorely needed.

[28] Long term productivity issues, a particularly hard economic impact of Covid on the economy and labour market, the energy crisis and increased cost of energy and many other products and, argued by many, longer term effects of Brexit on trade performance.

# 5. The economic benefits from the proposed development

5.1 This assessment of the economic benefits from the proposed development considers:

1) The benefits in terms of economic injection and employment that would stem from the **construction** of the proposed new data centre.

2) The **local level** economic benefits (for Buckinghamshire and surroundings areas) that would stem from the operation of the data centre.

3) The critical **wider benefits** to the UK economy from meeting the need for an expansion of data centre capacity.

5.2 Buckinghamshire Council have not taken any issue with the evidence supplied with the planning application and to the previous Inquiry in February 2023 on economic needs and benefits in terms of the quantum of benefits that would be produced for the previous scheme (jobs, GVA, construction spend etc). In this section the earlier estimates are updated in light of the scale and parameters of the revised scheme and in the light of any new data that has become available.

5.3 The estimates of the likely jobs and other benefits use the following parameters that are based on the fully completed revised scheme (given the very high demand and need for data centres this is an entirely reasonable approach). These parameters are:

- A total 90MW of IT load supplied; and
- A total of 72,000 sqm of buildings (GEA).

## Sources of information

5.4 To estimate the direct on-site job benefits we have reviewed a wide range of evidence on existing and planned schemes and on data centres as a whole. The list of sources used is summarised in Box 5.1.

**Box 5.1: Sources used to estimate economic impacts of the proposed new data centre**

| Source | Comments |
|---|---|
| Magnum Economics (2022) | Estimates of the importance of data centres in North Virginia to the State economy of Virginia for the Northern Virginia Technology Council (NVTC) |
| Oxford Economics (2018) | Study of the economic benefits of six major Google data centres in six different states in the USA. For comparability we have used the direct operational jobs figures only and the areas of the data centres. |
| Copenhagen Economics (2019) | A study of the forecasts benefits of a proposed new hyperscale Google data centre (now built) in Denmark. We have used the forecasts of direct operational jobs. |
| Menon Economics (2017) | Includes an assessment of the forecast direct jobs numbers for a new data centre in Norway with three computer halls each “approximately 30,000 m2 with an installed electrical power of just above 30 MW”. |
| Broxbourne Borough Council (2019 and 2020) and RPS (2018) | Job estimates for the new Google hyperscale data centre that has recently received planning permission at a site in Cheshunt in Hertfordshire. The updated job estimates were 200 to 300 fte jobs for a 62,200 sqm data centre. |

| Box 5.1: Sources used to estimate economic impacts of the proposed new data centre | |
|---|---|
| **Source** | **Comments** |
| Dutch Data Centre Association (DDCA) (2018, 2019 and 2020) | Produce estimates of total jobs, total area and total power of colocation data centres for these three years. Have taken the averages from these. |
| IDA (2018) | Study by Grant Thornton for the Ireland Development Agency of the economic footprints of data centres in Ireland (which are focussed on hyperscale data centres). |
| Savills (2022) | Assessment of jobs created for London 4 data centre, Hayes for Colt Data Centre Services |

5.5 The recent research for Northern Virginia (the world's largest concentration of data centres) sheds light on the nature of supply chains and so associated knock-on, ripple or multiplier jobs and economic activity[29]. As is explained below, Northern Virginia is a larger area than Buckinghamshire, comparable in size to the three LEP areas of Buckinghamshire, Oxfordshire and the Thames Valley, but smaller than the whole South East. Clearly the labour market and structure of the economy is not the same in Northern Virginia as Buckinghamshire or the South East of England. However, there are definitely strong parallels in the scales of the different economies.

## *Economic impacts from the construction of the data centre*

5.6 A 90MW load hyperscale data centre represents a **very substantial investment for the UK**. A large data centre requires at first very significant expenditure in the initial set-up phase in both buildings and plant and equipment. The data centre then undergoes periodic expansion and renovation as the operator updates its infrastructure to meet customer demand and integrate the latest technological advances. There is, therefore, ongoing capital expenditure throughout the life of a data centre. Often repairs, replacement, and upgrade of IT equipment and infrastructure begin in year three of operation.

5.7 This means that it is difficult to capture the total role of capital expenditure in economic value and jobs creation. For this reason, many economic estimates use average capital expenditure for a data centre over time to assess the average annual or total economic contribution spread over a number of years. For several of the estimates reviewed, typically over a 7 to 10 year period from when work starts on a large data centre, the average (or cumulative total) jobs and economic activity supported by the initial and the subsequent capital expenditures can be of the same order of magnitude or even exceed those for the operational activity .

5.8 Work by the US Chamber of Commerce (US COC, 2017) helpfully sets out the cost components of data centres. The USCoC explains the construction of a "typical" data centre covers:

- Base building construction - architectural, planning and design, building permits, local taxes, land excavation and grading, roadways, tie-ins to utilities, and the building shell (around 20% of all capital costs excluding land).
- Mechanical and electronic equipment purchases and installation - costs include mechanical and electronic equipment (account for an estimated 75% to 80% of the initial capital costs).

[29] Magnum Economics (2022)

5.9 A more detailed breakdown is that the cost components of construction comprise:

- Land and building shell (15% to 20%): covering building shell, raised floors.
- Electrical systems (40% to 45%): covering electrical backup generator, batteries, power distribution unit (PDU), uninterruptible power supply (UPS), switchgear/transformers.
- Heating, ventilation, and air conditioning (HVAC)/mechanical/cooling systems (15% to 20%): covering computer room air conditioner, computer room air handler, air cooled chillers, chilled water storage and pipes.
- Building fit-out (20% to 25%): covering lobby / entrance, meet-me room, shipping & receiving area[30].

5.10 It is important to note that these are building construction costs elements only and exclude professional fees. These cost elements also exclude servers, data storage equipment, and networking devices that are not attached to the building shell.

5.11 The most recent international data centre cost benchmarking by Turner and Townsend (2023) suggests that, in 2023, data centre building costs in London are around $10.19 per watt or £8.22 million per MW IT load[31]. Based on this benchmark the construction cost elements in the proposed data centre would cost around £740 million.

5.12 The cost benchmark covers constructing a data centre to shell and core and includes:

- Architectural fit-out and finishes;
- Mechanical and electrical fit-out;
- General contractor preliminaries, margin and contingency; and
- Mechanical and electrical equipment.

5.13 However it excludes: utility works, groundworks, site works, active IT equipment, fibre cabling to support office fit-outs or professional services fees. These cost components, particularly active IT equipment (eg servers) account for a large element of the overall cost of all the elements of an operational data centre.

5.14 Most data centre operators build the overall shell and core of the data centre as well as supply all the mechanical and electrical equipment and systems. Then customers provide the racking for servers and severs themselves. In the case of hyperscale data centres built for the own use by a hyperscale operator (such as Google, Microsoft or AWS).

5.15 Other sector rules of thumb are that the current costs to build a data centre (in North America) are $600 to $1,100 per sqft (gross) or $7 million to $12 million per MW of commissioned IT load. Applied to the proposed development[32], these rules of thumb would produce total construction costs of from around £510 million to £870 million.

5.16 A recent announcement of the building of a new 48MW data centre campus in London indicated a total cost of £500 million for the development (or £10.4 million per MW)[33].

[30] As set out in UK CoC 2017 and also sourced from https://dgtlinfra.com/how-much-does-it-cost-to-build-a-data-center/ (November 2023)

[31] Based on a £1= $1.24 exchange rate as of September 2023

[32] As noted earlier, construction costs per MW are very similar as between London and Northern Virginia so this is a reasonable approach.

[33] https://vantage-dc.com/news/vantage-data-centers-enters-london-market-with-500-million-investment/ We do not know the precisely what is included and excluded in this cost estimate.

5.17 Averaged across all these estimates (see Table 5.1), we have used a central estimate of construction costs in 2023 prices of around £760 million (£0.77 billion). This figure is not the total value of the investment as it excludes the very substantial cost of the computing, networking and communications kit as well as external works and infrastructure etc likely to bring the total value of the investment to well over £1 billion.

**Table 5.1: Estimates of the construction cost* of the proposed development (late 2023 prices)**

| Based on cost per: | Lower £ms | Higher £ms |
|---|---|---|
| MW IT load (US) | £508 | £871 |
| London specific costs based on MW of IT load (T&T, 2023) | £739 | |
| London specific cost based on costs for larger London-based data centre | £938 | |
| Average of all of above values* | **£764** | |

*Notes: * **excludes** (1) servers and other IT equipment not attached to the building (including racks); (2) professional fees; (3) and also excludes cost of ground works, infrastructure, wider landscaping and new road and other services access. $ prices converted to £s based on £1= $1.24*

5.18 This level of capital expenditure will support very substantial levels of jobs both on-site and in suppliers. The research mentioned previously for Northern Virginia showed that in 2021 for every 100 direct construction jobs a further 65 were supported elsewhere by supply chain and multiplier effects in all Virginia[34] and that every $200,000 (roughly £160,000) of economic output on construction (i.e. construction activity) supported one job. Updating to 2023, taking account of cost inflation, this would equate to around £180,000 of build cost per FTE construction job[35].

5.19 We have applied these values to the proposed development and estimate that the completed scheme could support:

- Around 4,200 person years of direct employment associated with the construction (both on and off-site); and
- A total of 6,900 person years of employment across the London and the South East economy taking into account supply chain and multiplier effects.

## *Local economic impacts from the operation of the data centre*

5.20 Data centres are very large scale and capital intensive projects that involve a high degree of energy and IT infrastructure. They are highly automated forms of economic activity but still do require significant numbers of skilled and well-paid on-site staff to ensure they can remain operational at all time.

5.21 The number of staff and types of jobs will depend ultimately on the precise form of the data centre and who operates it and how many and what type of customers there are in the data centre. To estimate the direct on-site job benefits we have used the wide range of evidence on existing and planned schemes and on data centres as a whole summarised earlier in Box 5.1.

[34] And 55 jobs just in Northern Virginia

[35] The Turner and Townsend Data Centre Cost index for London has increased by 12% between 2021 and 2023 from $9.1 to $10.2 per watt of data centre capacity

### *Direct on-site jobs created*

5.22 We have drawn on these sources to estimate a range of parameters for the number of FTE on-site jobs per 1 MW of installed electricity capacity or per 10,000 sqm of space. As would be expected, given the different size, type and purpose of data centres there is a wide range of values across the various sources used. The approach therefore is to take the averages of these estimates of parameters and ranges and then applied this to the scale of the proposed Iver data centre.

5.23 There is also some, now rather dated HCA Guidance on job densities for data centres based on floor areas produced in 2015. This suggests that the number of FTE jobs could range as shown in Table 5.2 from 180 sqm up to over 1,000 sqm (NIA) per job. Although these parameters have been used by some in making estimates of employment, we consider that they are of relatively limited use as: (a) they are based on historic data from much smaller data centres than those that are now being built; and (b) the operating models for data centres have continued to change.

**Table 5.2: Employment densities for data centres, 2015**

| Type of data centre | Sqm (NIA) per FTE jobs (range given) | | Mid-point of range |
|---|---|---|---|
| | Low | High | |
| Colocation facility | 180 | 540 | 360 |
| Wholesale | 200 | 950 | 575 |
| Wholesale (dark site) | 440 | 1,400 | 920 |
| Source: HCA, 2015 | | | |

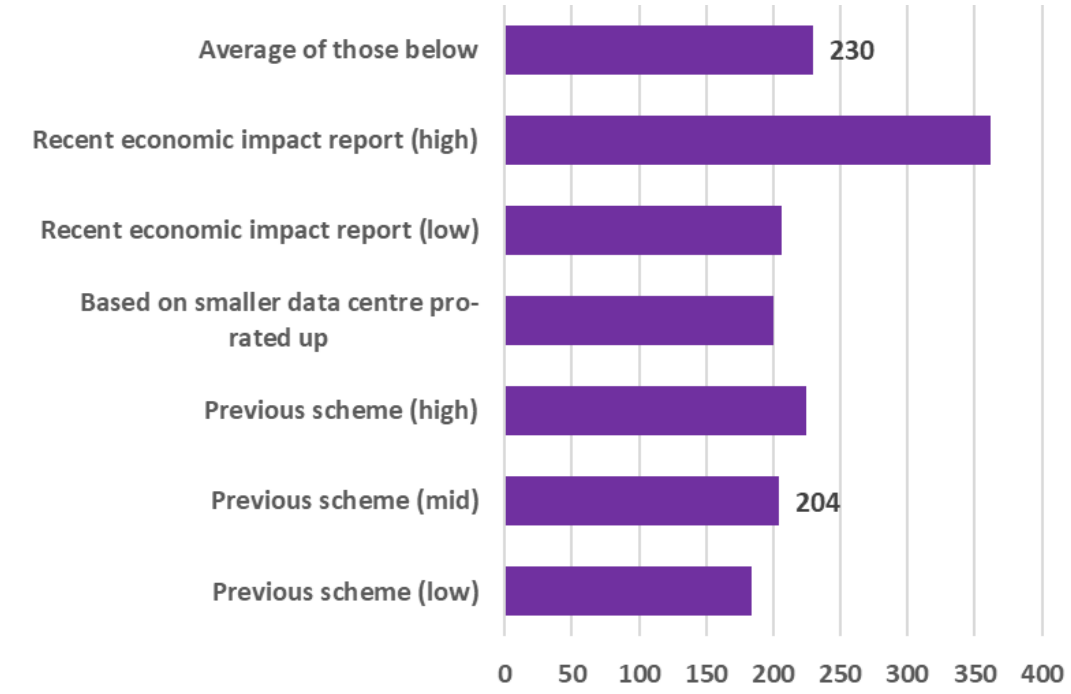
5.24 A recent economic benefits assessment for a data centre scheme in West London[36] uses parameters described as "*average employment density per megawatt experienced at other UK data centres*" of 2.3 FTE jobs for every 1MW of IT Load for on-site technical support staff. In addition, the report suggests a further 3.45 FTE jobs amongst client staff (ie the businesses using the data centre) for every 1MW of IT Load (of which 50% are assumed to be on site). Applying these parameters to the proposed revised scheme would equate to around 205 FTE jobs on site in technical services and, potentially, around 155 FTE jobs in client-side staff on site.

5.25 For the previous scheme at WLTP which delivered 147MW of IT Load our previous mid-range estimates of operational jobs supported was 366 FTE (rounded to 370), but with a range of from around 300 to up to 450 FTE jobs. The range reflects the different operating models of data centres form which the evidence is drawn (for instance what staff are included for co-location centres does this include client staff on site as well as the data centre operator). These estimates simply prorated to reflect the reduced IT Load in the revised scheme would be from 184 to 224 FTE jobs, with a mid-range of 204 FTE jobs.

5.26 In Figure 5.1 we show the range of estimates applied from different schemes. The simple unweighted average of these is **230 FTE jobs** and we consider this a reasonable figure to use for the purposes of economic estimates. It is slightly higher relative to the IT Load that the previous estimates, this is result of including other benchmark information and also taking into account that there is not an exact linear relationship between IT Load and jobs.

[36] Savills (2023)

**Figure 5.1: Range of job estimates for the proposed new data centre at WLTP**




*Source: Nicol Economics estimates*

### *Wages paid*

5.27 In Nicol Economics (2023), we used then up to date information on wage levels for those information sources that best cover these types of jobs in a location that is very close to London to estimate the total annual wages bill. This was based on the following evidence:

- For all **IT/computing** staff (hardware and software) the higher level was based on the latest information (July 2021) on average (mean) wages specifically for data centres[37] in London which is £67,500. The lower level was based on the average (mean) salaries for full-time workers for the telecommunications sector in 2019[38] for London and for the South East (£56,900).
- For **security/cleaning/ancillary** staff the lower figure was based on average (mean) 2019 full time salary for sectors covering cleaning and security in London and South East (£29,800)[39]; the higher figure was based on just the security sector (£32,220) in London and the South East.
- Finally for maintenance staff the lower figure was based on data from the "specialised construction activities" sector (which covers maintenance) for London and the South East (£40,900), the higher figure was based on the average full-time wage for the whole construction sector for London and the South East (£52,300).

[37] As posted on https://www.totaljobs.com/jobs/data-centre

[38] From the Annual Survey of Hours and Earnings (ASHE) sourced by the ONS website, for Sector 61 Telecommunications for London and South East

[39] From ASHE for Sectors SIC 81, "Services to Buildings and Landscape Activities" and 80, "Security and Investigation Activities" for London and South East

5.28 We have continued to use these average wage figures but have updated them all by the most recent annual earnings increase of 7.3% over the last 12 months[40]. The overall gross wage bill for the completed development (before taxes) is therefore estimated at between **£11.5** and **£13.8 million** annually for the central estimate of 230 FTE jobs and a central estimate of **£13 million** per annum.

5.29 The average wage levels for all workers at the proposed development range from £50,000 to £60,000 per FTE jo. These are significantly above average wage levels of the Buckinghamshire economy. In 2022 for those all full-time workers working in Buckinghamshire the median annual earning level for £36,000.

5.30 The research on Northern Virginia referred to above suggest that the average wage/benefits cost is around £130,000 in sterling equivalent. The average (mean) wages assumed above that is paid to workers in operating the proposed data centre **may be understated.** However**,** in the interests of caution we have continued with the assumption about wages paid in Nicol Economics (2023).

### *Direct Gross Value Added (GVA) created*

5.31 As explained earlier, data centres are extremely capital intensive forms of economic activity resulting from the costs of construction and the value of the equipment located within a data centre. There is limited robust data on the economic value of the output from data centres (in part because they are a very new form of economic activity). In the UK, the closest approximation is the data on the "data processing and hosting" sector (SIC 63.11). In 2019, according to the Annual Business Survey (ABS)[41], the total amount of GVA (economic output) from the information services sector (SIC 63) was £10.6 billion of which the data processing and hosting sector accounted for £7.0 billion[42].

5.32 The GVA per job filled in 2019 was £140,000 for the whole information services sector (SIC 63) and around £130,000 for the "data processing and hosting" sector (SIC 63.11). We have applied these figures for GVA per job to the job estimates to get a lower bound estimate for the **direct economic value** that will be created by the data centre. Using the ratio of FTE to all employees in the Information Services sector in 2019[43], the GVA generated (uprated to 2023 prices and values[44]) would be around £40 million of direct contribution to the local Buckinghamshire economy (as this is where the economic value is generated).

5.33 However, given the highly capital intensive nature of the proposed development, we have also looked at the estimate for Northern Virginia of the direct economic output produced per job in data centres there which are comparable in terms of scale to the proposed development, this was $600,000 (or £493,000) per job in 2021 or £525,000 in 2023 prices. Using this higher figure of GVA per job leads to a much larger estimate of **£121 million** in direct GVA. Given the scale and capital intensity of the proposed development, we consider this figure is the more robust one to use for a measure of the direct GVA generated by the activities at the development in Buckinghamshire.

[40] Average annual earnings in the 12 months to August to October 2023 as sourced from ONS

[41] The ABS is an annual sample survey of approximately 73,000 businesses across the United Kingdom by the ONS. The ABS draws its sample from the Inter-Departmental Business Register (IDBR).

[42] The total estimated value of GVA from SIC 61 to 63 (what is have referred to as the "data/information economy") was £104 billion.

[43] The last robust data pre-Covid

[44] We have used the GDP deflator to do this which is a 15% increase for 2019 to 2023 and 8.5% from 2021 to 2023

### *Other indirect and induced economic effects*

5.34 All forms of economic activity produce wider benefits via so-called **multiplier effects**. These stem from: supply chain effects ("indirect impacts"); and from the jobs and economic activity supported by the wages of those employed directly and indirectly ("induced impacts"). The scale of these effects depends on a wide range of factors: the nature and location of key purchases by the data centre; the area of impact considered (the larger the area the bigger will be these effect); and the economic base of the surrounding area (if businesses there are able to provide the key inputs and purchases or if these need to be supplied from further afield or abroad).

5.35 It is not possible to assess the precise scale and location of these effects for the proposed project. However, there are useful indicators of the potential scale of these effects at the level of the UK or regional (London and the South East) economy:

- The research from the recent study on data centres in Northern Virginia showed that the multipliers (ratio of indirect and induced effects to direct effects) were 4.1, 1.9 and 1.9 for jobs, wages and GVA respectively (at the level of the State of Virginia[45]).
- A study by Oxford Economics[46] for Google estimated the indirect effects at a US state level to be around 0.94 indirect jobs for every one direct job in a Google data centre.
- The estimates for the country of Norway were an overall multiplier of 1.22 for jobs and 1.25 for GDP (and for just indirect effects around 0.7 for jobs and 0.8 for economic value)[47].

5.36 The size of these two economies considered (Virginia and Norway) range from around 14% to 20% of the whole UK economy and 37% to 51% of the whole combined economies of London and the South East[48]. Therefore, it is reasonable to assume that these scales of relative indirect and induced multiplier effects would occur (and could well be higher) at the level of the regional areas around the proposed development. (This is because the size of the London and South East combined economy is comparable to these other economies on which estimates are based).

5.37 Therefore, an overall multiplier for GVA of 1.0 to 1.2 (or around 0.6 to 0.7 for supply chain effects only) would be reasonable to apply for the bottom end of the range and one of nearer 2.0 to the top end of the range. Using these assumptions, the overall full impact of the development would be the creation of around **£270 million to £350 million** annually in overall economic activity (i.e., GVA) across London and the South East economies (see Table 5.3). For jobs, the total impact would range from around **500** up to **1,100 FTE extra jobs** across London and the wider South East[49].

[45] The GDP of the State of Virginia was around $557 billion dollars in 2019 or roughly a fifth (20%) of the size of the UK economy £2,170 billion (its population at 9 million is about 13% of the UK's population)

[46] Oxford Economics (2018) but ranged from 0.7 in South Carolina up to 1.35 in Georgia.

[47] The GDP of the whole country of Norway was around $403 billion dollars in 2019 or roughly a fifth (14%) of the size of the UK economy £2,172 billion (its population at 5.3 million was about 13% of the UK's population)

[48] In 2019 these two regions accounted for 37% of all UK GVA (£470 billion for London, £290 billion for the South East out of a total for the UK of £1,980). Sourced from ONS Regional Gross Value Added (balanced) by industry, May 2021

[49] Note: there is a larger variance for the jobs multiplier than for the GVA multiplier

| Table 5.3: Estimates of overall jobs and GVA creation by the proposed new data centre for the London and South East area | | | | |
|---|---|---|---|---|
| Type of economic effect | Jobs (FTEs) | | GVA (£ millions) | |
| | Lower | Higher | Lower | Higher |
| Direct (A) | **230** | | **£121** | |
| Indirect and induced (or multiplier effects) (B) | 280 | 894 | £151 | £232 |
| Total (C=A+B) | 510 | 1,124 | £272 | £353 |
| Rounded | **500** | **1,100** | **£270** | **£350** |
| *Source: Nicol Economics estimates applying parameters from other studies. Notes: these assume the development is fully built out; these are the gross effects and assume the economic benefits are fully realised, they do not take into account any possible displacement or substitution (crowding out) effects in the labour market* | | | | |

### Location of job and supply chain benefits

5.38 The development site is located in the local authority area of Buckinghamshire. This is where the direct economic activity will take place and jobs be located. However, the site is located close to the boundary of the London Borough of Hillingdon and relatively close to Slough and other parts of London (especially the London Borough Hounslow where Heathrow is located). There are likely to be different travel to work patterns depending on the type of jobs, the hours worked and even the age of the employee.

5.39 It is difficult to say with any degree of certainty how many of the jobs would be taken by residents of Buckinghamshire (which is a large local authority area with some centres of population (such as Buckingham) which are some distance (50 miles) away from the proposed development). In 2019, Buckinghamshire accounted for around 40% of the overall number of jobs and of people of working age in the combined overall area of Buckinghamshire, Slough and the London Boroughs of Hillingdon and Hounslow. This gives a good indication as to what proportion of the jobs might or potentially could be filled by residents of the local authority.

5.40 Much will depend on the skills mix of the jobs and of the residents of surrounding areas as well as approaches to recruitment and training. At present, there is very strong demand for people involved in the development and operation of data centres in the UK (not surprising given the rapid growth in the sector). There is a very significant opportunity to develop training and other skills programmes or support existing activity to maximise the chances, especially for young people, to access these opportunities. Support to facilitate this is set out in the draft Section 106 agreement.

## *Support for the economy prosperity of the UK*

5.41 The economic benefits from the proposed development have been considered so far purely in terms of it as an investment and capital project and then provider of employment and on-going economic value. However, the most important benefit from the proposed development is the contribution to **meeting the UK's need for data centres** and so supporting wider economic growth, improved productivity, and current and future societal needs.

5.42 Data centre capacity is part of the critical digital or data infrastructure that currently underpins the UK economy. Its importance to the UK economy increases year on year. The various government strategies and policy document covered in Section 3 earlier make this point abundantly clear.

5.43 The proposed development at 90MW of installed IT capacity is very substantial and so will make a **very significant contribution to the growing need for data centres** of the right type in the right location. To put this in context it would represent around:

- 10% of all reported installed capacity as of 2023 in the London area[50];
- Around 6% of the forecast average growth of IT load in need for new data centre capacity (largely hyperscale) in the Slough and Hayes AZ area from 2023 to 2027 (inclusive); and
- Around 4% of all the forecast average growth from 2023 to 2027 of all data centre IT load in the London area[51].

5.44 As the evidence makes clear, there is very strong growth in the demand and need for large scale data centre capacity in the London area to serve the needs of the UK economy in the way that the large data centre operators need to do.

## *Consequences of not providing capacity to meet need*

5.45 There are three wider consequences of not approving this proposed development and so adding considerable extra data centre capacity

- First, a substantial investment of well over £1 billion will be lost with the concomitant investment and jobs that are sorely needed by the UK economy. Data centre providers continually consider locations across Europe and indeed globally. If this investment does not occur then there is a clear risk that a hyperscale data centre will be developed somewhere else in Europe (likely at another FALP-D location). This would lead to both a loss of possible investment and, critically, the loss of much needed extra data centre capacity in the UK. Recent evidence on the FLAP-D market[52] suggests that London may be starting to lose its market leading position with extra data centre capacity being added much more quickly in Frankfurt and Paris at present.
- Secondly, the failure to provide additional capacity will **restrict the growth of our increasingly data driven economy**. There is a need for UK based capacity to meet data storage and regulatory requirements as well as to provide proximity to data for sectors where real time access is critical.
- Finally, there are **key sectors** of the economy that are critical for future growth and that are highly data dependent including but by no means limited to financial services. The ability of these sectors and businesses to operate competitively and to grow will be impacted by any deficiency in data storage capacity (such as higher latency, increased costs etc).

5.46 As explained in Section 4 there are several drivers which mean that for the benefit of the UK economy data **needs to be stored in data centres in the UK**:

1) Security/sovereignty reasons; and

2) Quality of service reasons.

[50] This refers to data centre capacity as reported in JLL 2023b (and is total colocation capacity there is limited hyperscale capacity in London at this stage)

[51] The installed IT capacity refers to known co-location and hyperscale data centre capacity in the wider London area; the growth forecasts come from work in the JLL Technical Note (2023a)

[52] JLL, 2023b. In the first half of 2023

5.47 In theory that latter issue can be addressed by extra data capacity at locations outside the UK/London (i.e., other FALP-D centres) however this would lead to a **reduction in the quality of service** to businesses in the wider London and South East area due to latency (speed of service). The relationship between data usage, the speed and reliance of data, and economy activity is highly complex. It is difficult to assess with any degree of precision the impact of a future lack of UK/London data capacity on the UK economy. The effects would be a large number of small scale factors rather than one single one off event.

5.48 As set out earlier in Section 4, the value in 2019 of the UK Information Services sector (covering data centres) was £10.4 billion, this will have risen since then as the role of data centres and use of data expands in absolute and relative terms. Also, in 2019 the whole UK economy, excluding the IT and telecoms sector itself purchased some £71.8 billion of services from the IT sector in its broadest sense[53], of this total £47.2 billion was purchased by the most IT/data intensive sectors.

5.49 It therefore only takes a very marginal increase in the cost or value of these services to generate a very large economic impact. In Table 5.4 we show these potential effects. Even a tiny 0.05% change (just 1 in 2,000) produces a £24 million pa increased cost/reduced value across the whole of these sectors in the UK economy or £118 million over 5 years. These figures will understate the likely future role of a diminution of data centre capacity and so service levels for the UK economy because the importance of effective and speedy access to data has risen and will rise over time.

**Table 5.4: Impacts of changes in UK productivity of IT services costs**

| Total value of purchases of IT services, data intensive sectors 2018= £47.2 billion | Modelled productivity/cost effect (£ms) | | | | | | |
|---|---|---|---|---|---|---|---|
| | % | 0.25% | 0.20% | 0.15% | 0.10% | 0.075% | 0.05% |
| | 1 in every xxx | £400 | £500 | £667 | £1,000 | £1,333 | £2,000 |
| | Annual cost | £118 | £94 | £71 | £47 | £35 | £24 |
| | 5-year cost | £590 | £472 | £354 | £236 | £177 | £118 |
| | 10-year cost | £1,179 | £943 | £707 | £472 | £354 | £236 |

Source: Nicol Economics calculations. Note: in 2018 prices and values

[53] Telecommunications, computer programming, consultancy and related activities and information service activities

# 6. Conclusions

6.1 The principal conclusions of this report are as follows:

1) The government recognises the vital and growing role of digital and data in the UK economy and has identified the need for a **secure and reliable digital infrastructure** to ensure the smooth functioning and to maximise the growth prospects of the economy. Data centres are a critical part of that digital infrastructure.

2) The UK and London relies on data intensive economic sectors as increasingly **key drivers** for the economy and as a source of net exports to the rest of the world and of inward investment.

3) There is very **strong growth in the need for data centres** globally, in Europe and in the UK. This is driven by powerful technological and societal trends as the economy becomes increasingly focused on the creation and use of data. London is the key centre at present for the location of data centres in the UK and, indeed, Europe. There is strong growth in demand for extra data centre capacity in the London areas especially for hyperscale data centres.

4) The proposed development would be a very **substantial capital investment** indeed. The full scheme would have a construction cost alone of the order of around £0.75 billion and total project value well over £1 billion. This would support of the order of 4,200 person years of direct employment associated with the construction (both on and off-site) and a total of 6,900 person years of employment across the London and South East economy taking into account all supply chain and multiplier effects.

5) The fully completed development would support significant numbers of well paid jobs in Buckinghamshire that would also be accessible to residents of West London and the area to the west of London. The mid-range and cautious estimate is that the completed development would support around **230 FTE jobs**, an annual wage bill of around **£13 million** and annual **direct GVA of some £120 million**. Taking into account of wider economic effects via suppliers and spend of wages in the local economies, the data centre would support of the order of £270 million to £350 million in GVA and 500 to 1,100 FTE jobs in total across the London and South East economies.

6) The development would support and strengthen the **existing cluster and digital eco-system** related to data centres and associated digital technologies that has developed in and around London - an area in which the UK is now one of the global leaders. It would therefore support directly key sectors which are targets for export growth and inward investment activity.

7) If there were no development of the proposed hyperscale data centre on the site at Iver, this would have a number of **adverse effects** for the local and wider UK economy. The data centre will provide of the order of nearly 6% of the growth in capacity needed over the five year need forecast period in the Slough and Hayes AZ area.

8) The growth in capacity in the UK is responding to demand and needs from the UK economy. A lack of growth in capacity to meet this demand and need would impact on the **ability of key sectors of the economy to perform effectively** and/or increase data costs for users. It is not possible to model these impacts precisely but, on reasonable assumptions, the cost to the UK economy could run into several hundreds of £s millions.

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**Nicol Economics**
**Bushby House**
**Greystoke**
**Penrith**
**CA11 0TF**
**www.nicol-economics.co.uk**
**info@nicol-economics.co.uk**

NICOL ECONOMICS