# Grids for data centres: ambitious grid planning can win Europe's AI race

Proactive electricity grid planning is a pull factor for data centres, driving economic activity.

Published date: 19 June 2025
Lead authors: Elisabeth Cremona, Pawel Czyzak

EMBER

# Contents


**About** **3**

**Key highlights** **3**

**Executive summary** **4**

**Chapter 1: Grids for data centres** **7**

1.1 Data centre deployment requires grid availability 7

1.2 Data centres bring economic growth and competitiveness 8

1.2.1 Data centres generate value for the economy 8

1.2.2 Competitiveness and data centres go hand in hand 9

1.3 Europe is facing a surge in power demand from data centres 10

1.3.1 Despite expectations of high growth, forecasts show the EU falling short of its goal to triple data centre capacity 12

1.4 Grids will decide where AI investments go in Europe 13

1.4.1 Growth is moving to markets with better grid availability 14

**Chapter 2: Rewiring for growth** **17**

2.1 Smarter grid connection agreements can significantly accelerate deployment 17

2.1.1 Countries could attract 20% more data centre growth by halving grid connection time 18

2.1.2 Phased grid connections enable collaborative infrastructure build up 19

2.1.3 Non-firm grid connections accelerate access to constrained networks 20

2.2 Data centre flexibility unlocks grid capacity 20

2.3 Strategic siting of data centres brings fast connections and reduces grid expansion needs 23

**Chapter 3: Conclusion** **25**

3.1 Recommendations 26

3.1.1 Governments and regulators need to recognise grids as strategic infrastructure for economic growth and competitiveness 26

3.1.2 Governments need to consider priority AI zones to tackle congestion 26

3.1.3 Spatial planning offers optimisation benefits in the long term 26

3.1.4 Smarter grid connection deals can fast-track data centre deployment 27

3.1.5 Data centre flexibility has vast potential, but requires more research 27

3.1.6 Better data availability is needed to unlock opportunities 27

**Supporting materials** **28**

**Methodology** **28**

Data centres – data availability and sources 28

Other data – sources 28

Contribution of data centres to the Norwegian economy 29

**Acknowledgements** **30**

# About

The report analyses trends in data centre deployment in Europe, assessing the impact of grid congestion on data centre growth and highlighting the shift from main markets to areas with lower grid barriers. The analysis also reviews grid connection times for data centres and suggests options for improved alignment of data centre and grid investments.

# Key highlights

## +150%

Projected increase in electricity demand from data centres in Europe from 2024 to 2035.

## 2x

Countries with lower grid congestion are expected to experience double the data centre growth.

## 7–10 years

It takes an average of 7-10 years to connect a data centre to the grid in legacy hubs. Options exist for slashing that down to 1 year.

# Grids will make or break Europe's AI ambitions

**While AI presents vast economic opportunities for Europe, the EU's position in the global AI race will only work if grids can accommodate the surge of new data centres.**

The EU has made AI plans foundational to its drive to boost Europe's competitiveness on global markets. To support this, in 2025 the EU launched InvestAI, which seeks to mobilise €200 billion for AI investments, and its AI Continent Action Plan, which sets the goal of at least tripling data centre capacity in the next five to seven years.

Data centres are key to unlock AI investments. However, grid constraints have become a significant barrier to deployment in traditional data centre hubs known in Europe as the FLAP-D markets (Frankfurt, London, Amsterdam, Paris and Dublin).

Data centres already have a huge local impact on power grids, and their presence is growing. In 2023, data centres consumed between 33% and 42% of electricity demand in Amsterdam, London and Frankfurt, and nearly 80% in Dublin. In these major markets, decreasing grid availability and increasing congestion is causing grid connection queues to build up.

With time to market being critical for industry players, better grid availability is becoming a defining factor for where developers bring investment. With data centres poised for rapid growth, countries that proactively plan grids for this will be best positioned to capture the economic and strategic benefits of AI.

## 01 Data centre demand is growing rapidly in Europe

Electricity demand of data centres in Europe is projected to grow from 96 TWh in 2024 to 168 TWh by 2030 and 236 TWh by 2035 – an increase of nearly 150% over the next decade. In markets such as Sweden, Denmark and Norway, demand is set to triple by 2030. This rapid growth positions data centres as one of the fastest growing sources of power demand in Europe, ahead of electric vehicles and comparable to electrified industry.

## 02 Grid congestion in major markets is pushing investors out – and other countries are cashing in

The Nordics and countries in Southern Europe – with uncongested grids and short wait times for connection – are expected to see data centre demand grow (+110%) at nearly double the rate of traditional market leaders Frankfurt, London, Amsterdam, Paris and Dublin (+55%) by 2030. This trend is expected to continue and by 2035, half of Europe's data centre capacity will be located outside the traditional data centre hubs as developers shift their investments to new markets.

## 03 It can take up to 13 years to connect a data centre to the grid

Long wait times are deterring data centre developers, but strategic choices by system operators and developers themselves can help overcome grid constraints, speeding up deployment of new facilities and reducing required infrastructure expansion. Solutions can include strategic siting of data centres, incorporating flexibility and applying smarter grid connection agreements. The latter could purportedly reduce time in the connection queue to just one year.

As Europe courts AI industries, grids will be a make-or-break factor. While hosting AI infrastructure promises tantalising benefits such as economic growth and digital sovereignty, these cannot materialise if grid congestion gets in the way. Countries investing now in innovative grids will more than likely emerge as Europe's data infrastructure hubs in the years to come.

**Elisabeth Cremona**
Senior Energy Analyst, Europe
Ember

# Europe's AI ambitions at risk of gridlock

**Europe's AI ambitions hinge on a rapid rollout of new data centres. The EU has set a target to triple its data centre capacity over the next five to seven years, but grid congestion threatens to slow progress.**

As Europe competes for leadership in the global artificial intelligence (AI) race, governments are responding with ambitious investment plans in cloud and edge computing. In February 2025, European Commission President Ursula von der Leyen launched InvestAI, an initiative to mobilise €200 billion for investment in AI. France's President Macron announced plans to invest €109 billion in AI over the next few years and the UK is preparing a ten-year investment plan for AI infrastructure.

## 1.1 Data centre deployment requires grid availability

AI advancements are driving a surge in demand for new data centres as existing facilities are in short supply or no longer fit-for-purpose, being unable to meet the massive need for computation power. However, data centre deployment is coming up against difficulties, and grids have emerged as the primary barrier in traditional data centre hubs. High congestion in these locations means grids are

unable to accommodate new facilities: Ireland, an investment hotspot for data centres, was forced to impose a de facto moratorium on new data centres in Dublin until 2028. Similar challenges have also emerged in other key markets like Frankfurt and Amsterdam.

Data centres pose unique challenges to electricity grids compared to other types of energy users. They represent large, localised loads which typically operate continuously and can ramp up their operations faster than most large energy users. Data centres are getting bigger as well. For instance, the Italian TSO Terna reports that data centre capacity applications exceed 140 MW on average. This means data centres have a major impact on the grid, being a large load that can come online in a single location, fast.

As network capacity becomes less available, and congestion and connection times ramp up, industry players are turning to new markets. Better grid availability means new data centres can get online faster and outpace their competitors.

## 1.2 Data centres bring economic growth and competitiveness

Investment in power grids has become an opportunity for countries to capitalise on the economic opportunities associated with data centre development. These can range from generation of domestic and foreign investment, job creation and new tax revenues, but also wider economic competitiveness, digital sovereignty and attracting broader tech-driven investments.

### 1.2.1 Data centres generate value for the economy

The European data centre market was valued at $47 billion in 2024 and is projected to reach $97 billion by 2030. The International Monetary Fund

estimates that between 2025 and 2030, an AI boom can increase the average annual growth rate of global GDP by 0.5 percentage point, but this is dependent on the timely deployment of data centre infrastructure.

In the Netherlands, the data centre and cloud industry is already responsible for 20% of all foreign direct investment (FDI) – making it the largest sector when it comes to FDI. In Germany, data centres are estimated to have contributed €10.4 billion to GDP in 2024, both directly and indirectly. This amount is expected to more than double to €23 billion by 2029. Similarly positive data comes from Norway, where data centres are estimated to have added €240 million to the economy in 2023 – more per unit of consumption than the traditional power-intensive industries such as the production of chemicals. The UK government claims that embracing AI will "lead to more money in the pockets of working people" and boost productivity by 1.5 percentage points every year, yielding €55 billion of added value annually over the next decade. The Irish government similarly believes that data centres play an "indispensable role in our economy and society".

Jobs are at stake as well. The Netherlands is a key example of the job opportunities that are associated with investments from the data centre and tech industry. Dutch data centres directly and indirectly employed around 11,000 people in 2020. This sector is also fundamental to 109,000 jobs in the tech hub and 2.1 million jobs in the digital economy. Jobs across these sectors are equivalent to 27% of total employment in the Netherlands in 2020.

### 1.2.2 Competitiveness and data centres go hand in hand

Beyond direct investment and job creation, the data centre industry brings a range of additional economic benefits. As a key technology enabler, it is a major pull factor for IT companies and fosters digital ecosystems, enabling Europe to capitalise on emerging opportunities in AI and quantum technologies. Building new data centres requires industrial automation solutions, an area where European firms hold a competitive edge with over half of the global market share. Indeed, four European industrial groups that provide components for data

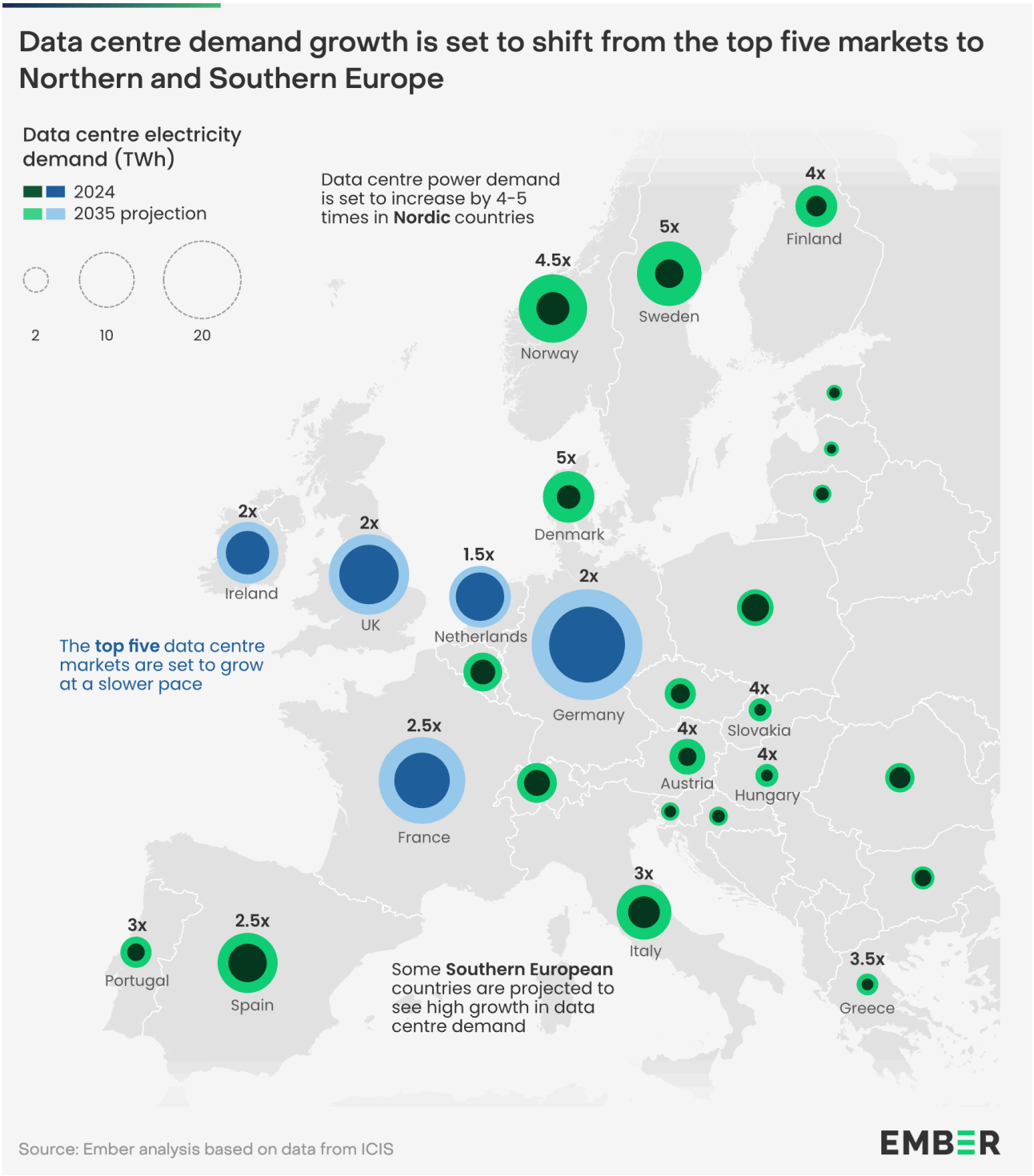
centres added more than €150 billion to their market caps since November 2022, on the back of AI's soaring demand for data centres. For one company, Siemens AG, this meant its market value grew by more than 60%.

Data centres also have a significant role to play in the EU's wider energy security and competitiveness agenda and its drive for digital sovereignty. Many AI applications require high levels of security and data control, making the location of digital infrastructure a strategic concern. The EU has identified digital and data sovereignty a central priority, emphasising the need for infrastructure that ensures European data is stored, processed and governed under EU laws.

## 1.3 Europe is facing a surge in power demand from data centres

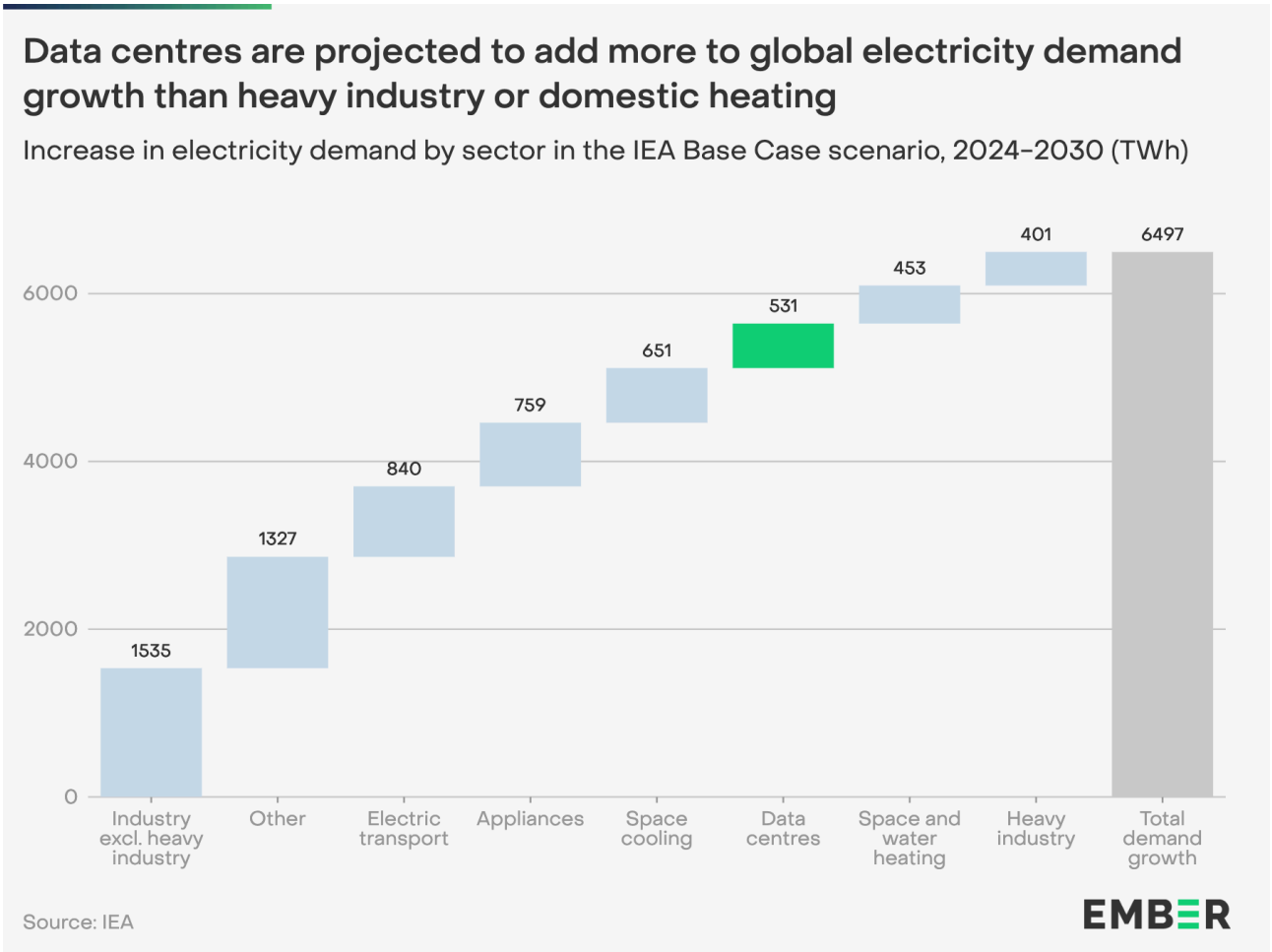
Data centres are already having an impact on Europe's electricity demand, particularly in key markets. European data centres consumed an estimated 96 TWh of electricity in 2024, equal to 3% of the region's total electricity demand. Among the top data centre markets, this ranged from 2% of national electricity demand in France, through 4% in Germany and the UK, to 7% in the Netherlands and 19% in Ireland. Their localised impact is even more significant. In 2023, data centres consumed 33% to 42% of all electricity in Amsterdam, London and Frankfurt – and almost 80% in Dublin.

Data centre power demand in Europe is expected to grow to 168 TWh in 2030 and 236 TWh in 2035, representing an increase of almost 150% in just ten years. Some markets are expecting enormous, rapid growth. In Sweden, Norway and Denmark, data centre electricity demand is expected to triple already by 2030. This trend is projected to continue and spread to other countries in the following five years, with Austria, Greece, Finland, Hungary, Italy, Portugal and Slovakia projected to see data centre consumption increase by three to five times by 2035 compared to 2024.



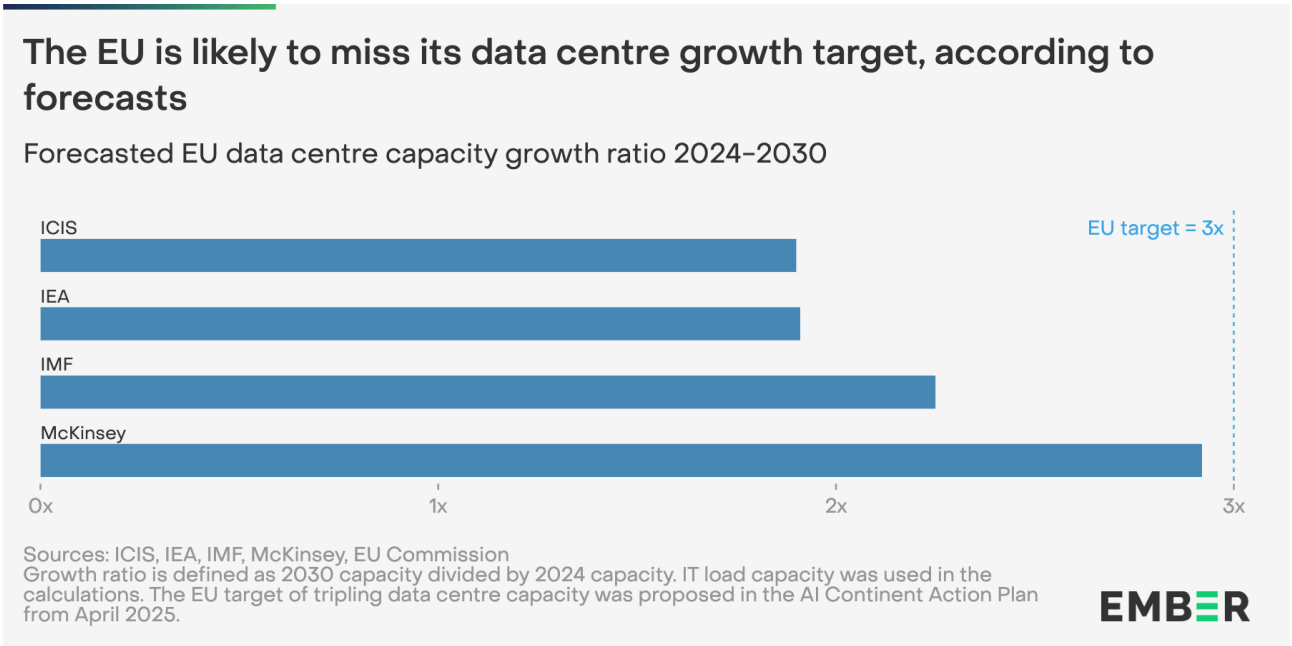

Recent research confirms that data centres will be a major contributor to increasing power demand. In Europe, ICIS estimates that their share of electricity demand will grow from 3% to 4.5% in 2030 and 5.7% in 2035. Data centre demand growth between now and 2030 (72 TWh) is

projected to be larger than that of electric vehicles (67 TWh) and comparable with electrified industry (80 TWh). At the global level, the IEA's outlook also sees data centres as a strong contributor to power demand, adding more in absolute terms than heavy industry or building heating by 2030.




### 1.3.1 Despite expectations of high growth, forecasts show the EU falling short of its goal to triple data centre capacity

In its AI Continent Action Plan released on 9th April 2025, the European Union set a goal of at least tripling data centre capacity within the next five to seven years. Yet forecasts from ICIS, IEA, IMF and McKinsey show the EU falling short of that goal, suggesting that a doubling of capacity by 2030 is more probable instead.




## 1.4 Grids will decide where AI investments go in Europe

The European data centre market has long been dominated by a handful of metropolitan hubs known as the FLAP-D markets: Frankfurt, London, Amsterdam, Paris and Dublin. Their historical appeal was driven primarily by proximity to major demand centres which meant fast data transmission.

Forecasts of growth, however, show the historical dominance of the FLAP-D markets beginning to erode. Growth is being forced to slow due to adverse impacts on the grid and congestion is causing data centre developers to move away from established hubs.

Currently, approximately 62% of Europe's data centre capacity is located in the FLAP-D markets, but this is expected to drop to 55% by 2030, and 51% by 2035. Of these five core markets, only France, where grid remains relatively unconstrained, is expected to maintain continued data centre investment. In Ireland, the

Netherlands and Frankfurt, grid operators have had to implement radical measures, effectively banning new data centres until at least 2030.

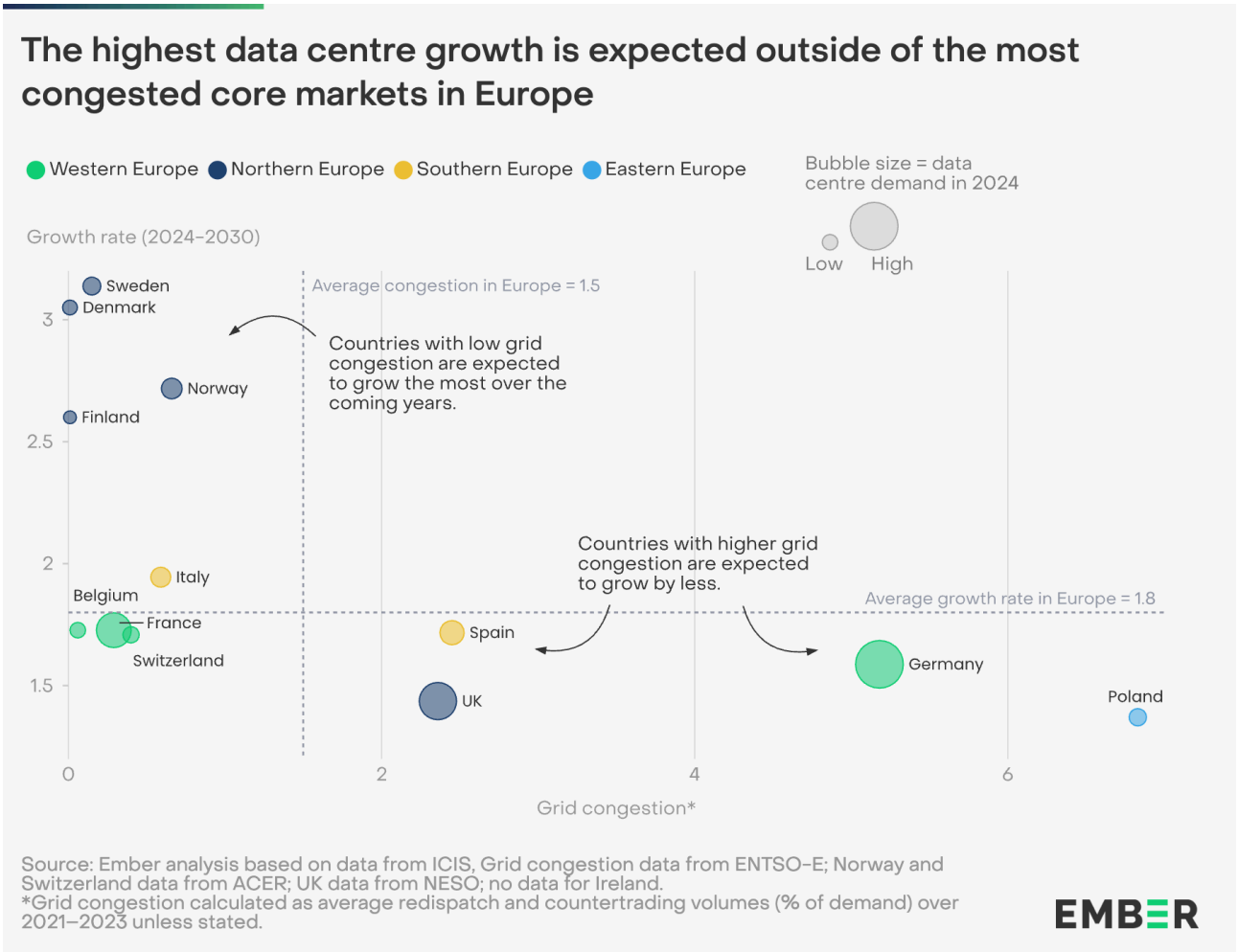
This suggests that grid infrastructure has become a critical factor influencing investment decisions, often outweighing other factors such as cost of land, economic incentives and attractive regulatory frameworks.

### 1.4.1 Growth is moving to markets with better grid availability

Growth outside the FLAP-D markets is expected to be far stronger over the next five years. Other countries will see data centre demand growth increase by 110% between now and 2030, double the rate in FLAP-D markets (+55%).

The Nordics top the list for data centre expansion. They have some of the lowest levels of grid congestion in Europe and offer the added benefits of low electricity prices and carbon intensity, inexpensive land and reduced cooling needs thanks to colder climates. The good state of the grid stems from intentional and deliberate planning choices. For instance, Norway's TSO Statnett is planning for a tripling of data centres' electricity demand by 2030 compared to 2022, and up to 15 TWh of data centre power consumption in 2050.

The Danish TSO Energinet was looking to position Denmark as a future data centres hub as early as 2017, building high voltage substations in preparation to connect data centres to the transmission grid. As a result, Denmark has been a top destination for data centre developments, with a huge capacity growth of 26% annually for the past five years. The trend is starting to slow as the grid becomes increasingly saturated in key zones, but is still expected to maintain an impressive 12% annual growth over the next five years.




Belgium is also expected to see strong growth in the next five to ten years, with data centre demand increasing by 72% between 2024–2030 and a further 42% between 2030–2035. Data centre trends have been consistently monitored by the TSO and incorporated into its grid development planning, enabling forward-looking network expansion that paves the way for such investments.

Belgium's grid preparedness has been a major pull factor for developers, to the extent that its system operators, Elia (TSO) and Fluvius (DSO), recently raised concerns over the sharp increase in grid connection applications submitted for new data centres in Flanders. In response, the grid operators are working in consultation with the Flemish government to optimise the location of new data centres to alleviate grid congestion concerns. The surge in applications for very high capacities appears to be related to grid conditions in the Netherlands and

Germany which are causing project developers to turn to Belgium where grid availability remains more accommodating for now.

This highlights an important developer trend. Major industry players will not wait for the necessary infrastructure to be built – they will just move to where it is readily available. Indeed, EirGrid flagged its concerns to the Irish Government last year over a potential "mass exodus" of data centres, warning that technology companies will look elsewhere if they cannot connect to the grid. Well planned grids have become a key trigger for economic activity and investments, while unprepared grids have become a barrier.

# Smarter grid strategies can unlock digital investments

**With AI bringing many opportunities, countries are competing to attract digital infrastructure investments. Those taking decisive action to prepare their grids for AI investments will be the ones best positioned to capture the economic and security benefits they bring.**

Deploying new data centres often requires substantial available grid capacity at a single location – an increasingly scarce resource. However, strategic choices by developers and grid operators can help overcome these constraints, speeding up the deployment of new facilities, while also reducing the required infrastructure expansion to accommodate the growing sector.

## 2.1 Smarter grid connection agreements can significantly accelerate deployment

Time to market is crucial for competitiveness, especially in the fast moving tech industry. Wait time for grid connection is therefore an important criterion for site selection of new data centres. But long connection queues are becoming

increasingly common across Europe, as system operators struggle to allocate capacity to new users, deterring data centre developers.

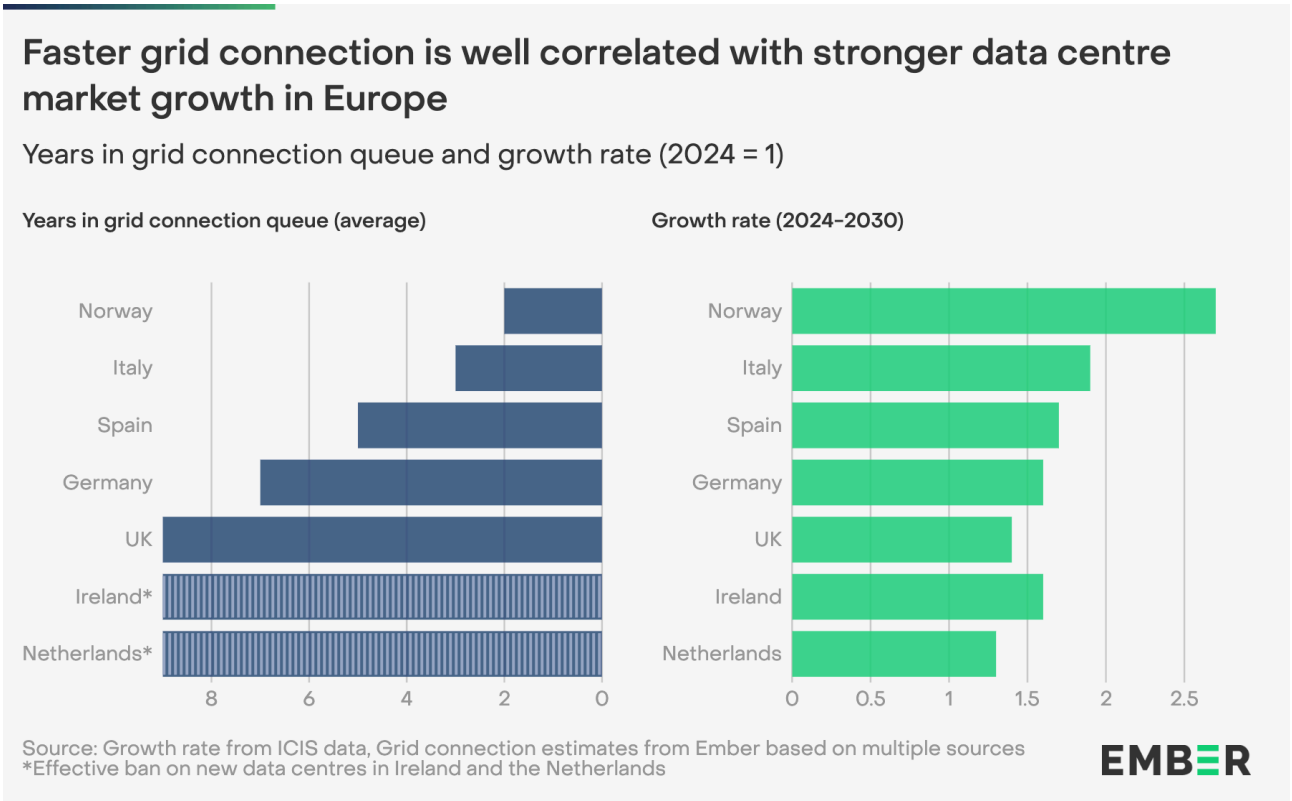
Building transmission infrastructure – which takes a long time – is not the only solution. Alternative forms of grid connections could secure a faster process while also bringing benefits for the grid. Such options are described in the following sections.

### 2.1.1 Countries could attract 20% more data centre growth by halving grid connection time

The average time to build a new data centre in Europe is approximately four years but varies widely across countries, particularly impacted by availability of grid capacity. In the FLAP-D markets, the historically high concentration of data centres in specific locations has led to a build up of grid congestion, with substations unable to support demand for additional capacities. New facilities wait an average of seven to ten years, or even up to 13, in some primary markets.

Countries with long grid connection queues are losing out on potential growth in their data centre markets – which is being reaped by others whose grids are better prepared to accommodate such demands. Currently, countries with half the connection time of key markets are set to attract around 20% more data centre growth by 2030.

Italy – where data centres wait as little as three years in the grid connection queue – stands out as a key market poised for significant growth over the next five years, alongside the Nordics and Belgium. This is reflected in the huge capacity of grid connection requests for data centres received by the Italian TSO Terna. By the end of 2024, the capacity of data centre projects in the queue stood at a staggering 30 GW, with almost 80% of these requests being registered in the last 12 months, highlighting the magnitude of project developer interest in newer, more accessible markets. 30 GW is equivalent to around 40% of Italy's current peak electricity demand, underscoring the scale of pressure that could be placed on the grid if even a fraction of these projects move forward.




### 2.1.2 Phased grid connections enable collaborative infrastructure build up

Available data suggests that data centres currently utilise only a fraction of their grid connection capacity, maintaining headroom to accommodate future growth. IEA and McKinsey data suggests that, on average, data centres in Europe only used 44% of their annual nominal power rating in 2024. The Irish TSO EirGrid reports that the average load currently drawn by data centre customers is approximately 34% of their contracted capacity. This is similar to reported figures for Norway where, out of the 500 MW connected to the grid, only 150 MW of that capacity was utilised in 2023 – a utilisation rate of just 30%.

Low utilisation of connection capacity makes data centres ideal candidates for a phased connection approach. Data centres could apply for an immediate connection capacity corresponding to around 50% of their needs, with the remaining 50% being delivered over an extended period of time. This provides both the developer and the grid operator with a clear path to scale, a welcome

development in sectors both exposed to significant uncertainties. In the US, this phased approach could purportedly reduce time in the connection queue by 80%, from 5–8 years to 12–18 months.

### 2.1.3 Non-firm grid connections accelerate access to constrained networks

Another relevant option for new data centres is a non-firm or flexible grid connection – where users agree, in advance, with system operators that their consumption may be interrupted under certain conditions such as extreme weather events. This allows new customers to connect to a constrained grid much faster and may bring additional benefits such as lower network tariffs. This setup is distinct from demand response, which is typically a market-based mechanism rather than a condition specified in a grid connection agreement.

## 2.2 Data centre flexibility unlocks grid capacity

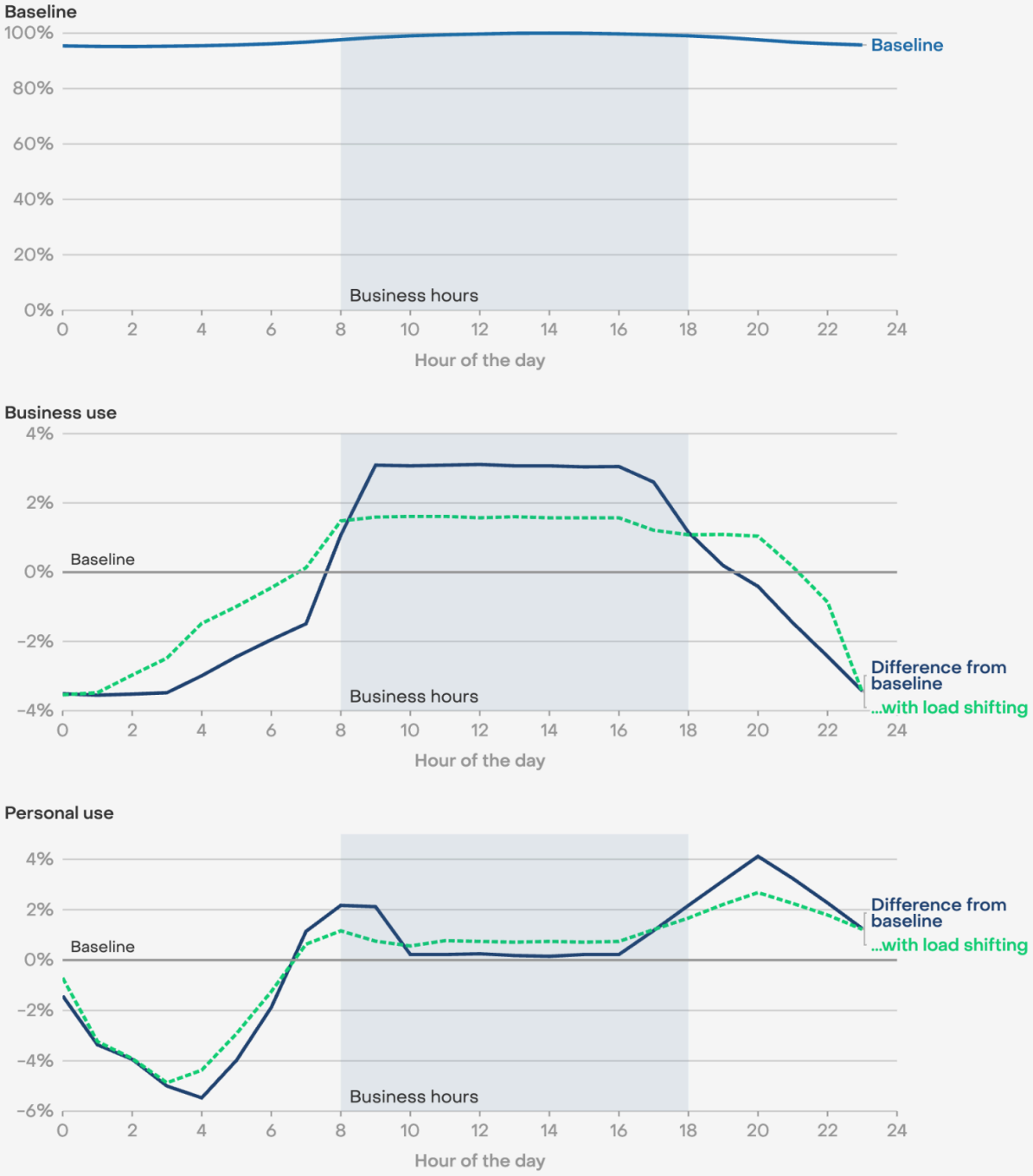
The idea of flexibility for data centres is gaining traction, stemming primarily from a need to overcome growing grid constraints. Adopting a flexible grid connection model can unlock capacity in grid constrained areas and shorten connection wait. A notable global initiative is DCFlex, launched in 2024 by the Electric Power Research Institute (EPRI), in collaboration with leading data centre investors and system operators, which aims to promote flexible grid integration for data centres.

Data centres are typically assumed to be firm loads, but real life data shows that even for colocation facilities, electricity consumption can drop or increase up to 30% between days, depending on the IT job performed. Some seasonal variation is present due to cooling needs as well. In the case of AI data centres, the electricity demand depends on model training and varies with the usage of the model by individuals and businesses. The load profiles can be optimised through

the batching of AI queries and different execution schedules that align with electricity prices, grid congestion and on-site generation. This presents an opportunity for more flexible power consumption, with benefits both for the grid and data centre operators.

## Data centre flexibility might be a solution to grid scarcity

Projected hourly data centre electricity demand and percentage change compared to baseline curve under different usage scenarios




Source: Ethree
The chart presents demand curves during low model training periods.

EMBER

The IEA estimates that if European data centres offered just 30 hours of flexibility annually, the grid capacity available for them could more than double. This would not mean that a data centre would be occasionally completely disconnected from the grid – the IEA model assumes that in "80% of the hours of grid stress, more than half of the usual grid electricity supply to the data centre would still be available. In 50% of these hours, around four-fifths of the grid capacity would be available". The side effects of the flexibility scheme could be offset further by the use of on-site backup generation and battery storage.

Data on data centre power consumption profiles is scarce, but assuming that this profile is completely flat, which is often done by grid operators, can lead to inaccurate modelling results. It also leaves no room for the assessment of data centre flexibility options, potentially overestimating grid investment needs. In contrast, Belgium's long-term electricity plan explores high levels of data centre flexibility – ranging from 0% to 50% and up to 75% depending on the scenario. With grid availability becoming a scarce resource, data centre flexibility might soon become mainstream in grid planning exercises.

## 2.3 Strategic siting of data centres brings fast connections and reduces grid expansion needs

Transmission grid access is a decisive factor in data centre site selection – yet building new lines and substations can take years. Fortunately, both grid operators and data centre developers can take actions to optimise their planning, reducing grid connection times and investment needs.

In the short term, grid operators can steer data centre developers towards priority zones with available grid capacity – e.g. post-industrial regions or areas with abundant clean electricity. Several countries are already piloting this approach. In France, EDF is offering ready-to-use industrial sites with a grid connection capacity of approximately 2 GW for data centre development

through a call for expressions of interest, with the aim of reducing project completion timelines by several years. Similarly, the UK government issued an expression of interest in February 2025 to enable identification of AI Growth Zones (AIGZ), with more than 200 responses received. Apart from identifying the most suitable sites, the call also sought to cluster the developments, looking for locations able to host or developers prepared to establish 500 MW+ of AI infrastructure (equivalent to enough energy to power 2 million homes). Italy's Terna is also looking to cluster requests from data centres for grid connection to minimise the risk of oversizing infrastructure.

In the longer term, strategic spatial planning comes into play, aligning grid investments with the needs of new generation assets, such as renewables, and demand assets, such as data centres. This requires collaboration between all involved parties, as showcased by the UK's NESO within the Strategic Spatial Energy Planning process. Such an approach might be challenging due to different planning horizons. TSOs typically require long-term offtake commitments to justify infrastructure investments, while data centre developers operate on shorter cycles, driven by rapidly evolving technology, shifting workloads and uncertain demand growth. Yet if executed correctly, a joint planning effort can provide benefits for all actors: reducing grid investment costs and optimising the use of existing grid infrastructure, and fast-tracking permitting and grid connection for data centre and renewables developers.

In the most advanced format of joint planning, data centres could be co-located with generation and storage assets, minimising the impact on transmission grids and potentially reducing network charges. But to unlock the efficiency gains that come with optimised energy system planning, grid operators need to first publish grid capacity maps. The availability of these would further attract investment, as data centre developers would identify areas where new capacity can be added quickly.

# Planning for the future

**Trends in data centre investment in Europe make it clear that grid capacity has become a prized resource and a pull factor for major investors. If Europe is to have a place in the global AI race, grid planners need to step up their game.**

The rapid development of AI can provide a much needed boost for European economies. But it will not happen unless the energy infrastructure is prepared to accommodate the necessary data centre expansion. Forward-looking and anticipatory grid planning is a key solution, but there are also short-term measures such as data centre flexibility and alternative connection contracts that can tackle grid congestion and unlock millions in investments. Multiple tactics need to be deployed in parallel to give Europe a chance of hitting its data centre deployment target and avoid further downgrading of forecasts. Countries that become leaders in innovative grid planning will likely emerge as Europe's new data centre hubs.

## 3.1 Recommendations

### 3.1.1 Governments and regulators need to recognise grids as strategic infrastructure for economic growth and competitiveness

Grid planning is no longer just about managing the power system – it is a strategic lever to attract high-value industries and unlock national economic ambitions. Countries seeking to attract such investments should adapt their grid planning practices and investment strategies accordingly. This requires more ambitious and forward-looking approaches, which are also crucial to enable anticipatory investments.

National grid development plans should recognise the opportunities coming with AI, but also electrification, flexibility and digitalisation. Planning for technological innovations ahead of time can become a pull factor for investments, bringing benefits for the economy and energy consumers. This is even more critical in sectors developing as quickly as data centres, where investment cycles are much shorter than in the case of grids.

### 3.1.2 Governments need to consider priority AI zones to tackle congestion

To keep AI investments in the country, governments and grid operators can direct AI projects into areas of better grid availability – e.g. outside of capital cities. This tactic is already being tested as a short-term solution to grid congestion in largely concentrated data centre hubs like Paris and London.

### 3.1.3 Spatial planning offers optimisation benefits in the long term

Joint spatial planning between grid operators, clean power developers and data centre investors can offer multiple benefits. Locating large electricity demand nodes close to clean energy supply infrastructure lowers grid investment needs. It also allows data centres to stabilise their electricity costs through near-site PPAs, which can deliver network charge savings as well.

### 3.1.4 Smarter grid connection deals can fast-track data centre deployment

System operators should offer phased or non-firm grid connection options to enable new data centres to connect faster and reduce growing queues. These solutions can be implemented quickly, even in highly congested areas, and can bring the additional benefit of improved utilisation of existing infrastructure.

### 3.1.5 Data centre flexibility has vast potential, but requires more research

Pilot projects on data centre flexibility should be initiated, given the potential to unlock capacity in grid constrained areas and shorten connection wait times. These projects might require research and development funding from governments and data centre companies, but can lead to savings in grid balancing and expansion costs.

### 3.1.6 Better data availability is needed to unlock opportunities

The abovementioned recommendations cannot be implemented without good availability of data on data centre locations, investment prospects, data centre demand profiles and utilisation scenarios. Grid operators need to provide grid capacity maps and demand-side connection queues as well.

These datasets are required for grid planning and modelling, spatial planning, designing policies and incentives, as well as research and development activities.

# Methodology

The geographic scope of this report covers the following countries: the EU27, the UK, Norway and Switzerland. Together, they are referred to as "Europe" in the report.

### Data centres – data availability and sources

There is a recognised lack of official statistics on data centres in Europe, both at regional and national level. This report uses data from a recent ICIS publication, unless otherwise specified, as it provides consistent and granular data for Europe in 2024 and annual forecasts until 2035, with the latter matching projections from the IEA and IMF.

It is important to note that uncertainty remains around the pace of data centre growth in the coming years. This will be influenced by algorithmic developments, computation efficiency trends in software and hardware and broader economic factors affecting the investment and supply chain.

### Other data – sources

The grid congestion indicator is based on a methodology from the IEA: using transmission grid congestion costs and volumes. For EU countries, data from ACER was used, specifically the volume of remedial actions activated in Member States. For the UK, the NESO Balancing Costs Annual Report 2024 was used. The

congestion proxy is the volume of remedial actions divided by the 2023 electricity demand (%).

Employment data for the Netherlands – to calculate the share of total employment related to the data centre sector – is based on annual employment figures from Eurostat for the age class 20 to 64 years. Online data code: lfsi_emp_a. Data extracted on 11th June 2025.

Wait times for grid connection were based on the following sources: IEA report on Energy and AI and a recent article from AVK-SEG, a company specialising in innovative power solutions, particularly for data centres. These were supplemented by more location-specific reports for the Netherlands, Germany, Frankfurt, Norway and Poland.

### Contribution of data centres to the Norwegian economy

A report from the Norwegian Data Centre Industry states that data centres deliver NOK 1.8 million in value creation effect per annual GWh. This figure was converted to an estimated total economic contribution in euros based on the following:

- The Norwegian Data Centre Industry report estimates that the data centre industry used around 1% of Norway's power production in 2023. Given the uncertainties that surround data centre consumption, maintaining consistency in sources was preferred.
- Ember data puts Norway's power production in 2023 as 154 TWh. Based on these figures, consumption of data centres was calculated to be 1540 GWh – putting the economic contribution of data centres as a total of NOK 2772 million.
- This was converted to euros for consistency with other figures in the report (€ 240 million).

# Acknowledgements

**Contributors**

Ember: Ali Candlin, Beatrice Petrovich, Sarah Brown, Lauren Orso, Claire Kaelin and Izabela Urbańska.

EirGrid Group: Conal Campbell, Senior Policy Lead

**Photo credit:** David Robinson / Alamy Stock Photo

© Ember, 2025

Published under a Creative Commons ShareAlike Attribution Licence (CC BY-SA 4.0). You are actively encouraged to share and adapt the report, but you must credit the authors and title, and you must share any material you create under the same licence.