NASSCOM®

Recommendations for Data Centre Policy

Executive Summary

Globally, data is being created at an unprecedented pace. Global Datasphere, which is the total amount of data created, stored and replicated is estimated to grow from 33 ZB in 2018, to 175 ZB by 2025.[1] Given this trend, there is a need for Data Centres to store data, which in turn can be leveraged to provide a variety of cloud services.

In this background, the Finance Minister in her Budget speech this year proposed bringing out a policy to enable the private sector to build Data Centre parks in India. In response to this announcement, NASSCOM formed a 10 member Data Centre Policy Taskforce, comprising of senior industry leaders, to propose recommendations that can help promote the growth of Data Centres in India. The key ones are listed below.

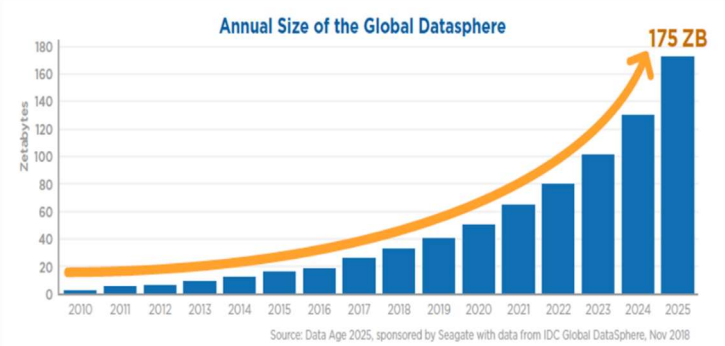
1. Establish Pre-Provisioned Data Centre Parks with necessary infrastructure to host multiple Data Centres.
2. Establish dual power grid networks to ensure uninterrupted supply of electricity.
3. Allow Data Centres to consume Renewable Energy procured directly from power producers through the open access system, without any restrictions.
4. Allow IP-I companies to share passive infrastructure directly with Data Centres in order to establish, maintain and operate an extended "private telegraph" (non-public telecommunications services) between two or more Data Centres in different locations.
5. Enable Data Centres entities to import dual use network equipment for internal use and network infrastructure.
6. Implement a Dial Before You Dig Policy (DBYDP), which would allow authorities responsible for carrying out construction work to access information about the underlying network infrastructure before digging.
7. Create Common Service Ducts and utility corridors in all new cities as well as State / National highway road projects.
8. Recognize Data Centres as a separate category in the National Building Code.
9. Introduce deemed approval system for statutory clearances.
10. Provide 'Infrastructure' status to Data Centres.
11. Notify Data Centres as Essential Services under "The Essential Services Maintenance Act, 1968"
12. Create an implementation mechanism to implement the above recommendations.

[1] Reinsel et al., 'The Digitization of the World: From Edge to Core', IDC White Paper, November 2018; available at: https://www.seagate.com/files/www-content/our-story/trends/files/idc-seagate-dataage-whitepaper.pdf

Background

The Finance Minister (FM) in her Budget speech this year proposed bringing out a policy to enable the private sector to build Data Centre parks in India. The FM also mentioned that this will enable firms to *"skillfully incorporate data in every step of their value chains"*.[2]

This announcement to build Data Centre parks in the country is significant and timely, given that the amount of data being generated globally has leapfrogged by several hundred times over the last decade. Today, companies rely on large volumes of data to add value to their supply chain and enhance customer experience by greater levels of personalisation. The consequence of this increasing reliance on data, is an infinite expansion in the size of the Global Datasphere.[3] Estimated to be 33 ZB in 2018, International Data Corporation (IDC) forecasts the Global Datasphere, to grow to 175 ZB by 2025.[4] With more data being generated, the need to process data to support high-end applications has also increased. This has spurred the growth of Data Centres worldwide.



Traditional Data Centres were built on dedicated infrastructures for each workload including network switches, blade systems, and dedicated computing. However, such Data Centres were unable to support the increasing complexities which have arisen due to big data, cloud computing and social media.[5] This has resulted in the need for developing hyperscale Data Centres that can ensure better performance and handle large-scale data requirements.

According to forecast made by Structure Research, the global colocation Data Centre market which stood at $39.4 bn in 2018 is expected to grow to 69.79 bn.[6] The Asia-Pacific (APAC) market is projected to become the world's largest colocation Data Centre market by 2021 at $19.8 bn; in doing so, it will overtake North America which is projected at $19.5 bn. This trend is expected to continue till 2024.[7] Europe, the Middle East and Africa (EMEA) is projected to reach $17.2 bn by 2024 and it is forecasted that Latin America will reach $1 bn for the first time in 2024.[8] This amounts to a global CAGR average of 9.9% for the

Region	Growth rate (2018-24)
Latin America	18.2%
APAC	12.2%
EMEA	11.1%
North America	6.4%

[2] The full text of the Union Budget 2020-21 is available at: https://www.indiabudget.gov.in/doc/Budget_Speech.pdf
[3] Lexico defines 'datasphere' as *"The notional environment in which digital data is stored; especially the internet viewed in this way"*; available at: https://www.lexico.com/definition/datasphere
[4] Reinsel et al., 'The Digitization of the World: From Edge to Core', IDC White Paper, November 2018; available at: https://www.seagate.com/files/www-content/our-story/trends/files/idc-seagate-dataage-whitepaper.pdf
[5] Markets & Markets, 'Hyperscale Data Centre Market by Solution (Server, Storage, Networking, Software), Service (Consulting, Installation and Deployment, Maintenance and Support), End-User, Data Centre Size, Industry, and Region - Global Forecast to 2022', May 2017; available at: https://www.marketsandmarkets.com/Market-Reports/hyperscale-data-Centre-market-26026183.html
[6] João Marques Lima, 'Time Travel To The Future: How The Data Centre Market Will Grow By 2024', *Data Economy*, 21 August 2019; available at: https://data-economy.com/time-travel-to-the-future-how-the-data-Centre-market-will-grow-by-2024/ (last accessed 12 March 2020).
[7] *Id*
[8] *Id*

time period 2018-2024.[9] The table above provides region-wise growth rates of the data-Centre market:[10]

In February 2020, India had close to 150 co-location Data Centres. City-wise figures on Data Centres in major cities in India are provided in the table.[11] The India Data Centre market size is forecasted to reach USD 1.5 billion by 2022 from USD 1.0 billion in 2018, at a Compound Annual Growth Rate (CAGR) of 11.4%.[12] It is projected that 431 MW (IT design power load) capacity will likely be added between 2020 and 2024; the existing capacity is 350 MW.[13] The growth in co-location Data Centres in India is attributed *inter alia* to global hyperscalers, companies increasingly locating their Data Centres within colocation Data Centres, and adoption of cloud services.[14]

Location	No. of data Centres
Delhi – NCR	26
Bengaluru	25
Chennai	12
Pune	9
Mumbai	27
Ahmedabad	6
Kolkata	7
Other cities	38

In India, the Data Centre market has seen a healthy growth in the last few years due to the explosion of data creation, and data consumption through smartphones, social media and e-commerce. In India, colocation setups are being deployed with cloud computing architecture, putting the country on a path to becoming one of the biggest hubs for colocation Data Centres globally.[15]

Despite the positive outlook for India as a Data Centre market in coming times, some challenges related to land, power and connectivity remain, which must be addressed to make India a Data Centre hub.[16]

Scope

This document identifies challenges faced by Data Centres, both at the stages of establishment and operation, and suggests policy solutions to address them.

Recommendations

Data Centres require significant amount of land, power and network connectivity and therefore, are capital intensive. Provisioning these resources at a competitive price in a speedy manner is a prerequisite to attract companies to set up Data Centres in India. This combined with easing of certain regulatory and operational measures should create the desired policy framework.

Based on industry consultation, we have identified certain key challenges and have provided suitable recommendations below.

[9] *Id*
[10] *Id*
[11] Data as per https://www.dataCentremap.com/india/
[12] Markets & Markets, 'India Data Centre Market by Component (Electrical, Mechanical, Communication, Security), Model (Captive, Outsourced), Vertical (BFSI, Telecom and ITES, Defense), Trends, Vendor Ecosystem Analysis, and Porters Five Forces Analysis - Forecast to 2022', April 2019; available at: https://www.marketsandmarkets.com/Market-Reports/india-data-Centre-market-173006400.html
[13] Virendra Soni, 'India's data Centre industry to see threefold revenue growth in five years; to reach $3.2 bn by FY 2023-24', *Daily Host News*, 13 December 2019; available at: https://www.dailyhostnews.com/indias-data-Centre-industry-to-see-threefold-growth
[14] Alan Richardson, 'Good times await Indian Data Centre Industry in 2020', *DataQuest*, 2 January 2020; available at: https://www.dqindia.com/good-times-await-indian-data-Centre-industry-2020/
[15] Colocation data Centres are shared facilities where different companies use the infrastructure.
[16] Shailesh Kumar, 'India Data Centre Market Must Focus on Implementing Best Practices', *Inc42*, 16 November 2019; available at: https://inc42.com/resources/indian-data-Centre-market-must-focus-on-implementing-best-practices/

Recommendation 1: Establish Pre-Provisioned Data Centre Parks with necessary infrastructure to host multiple Data Centres.

To be actioned by: State Governments.

Rationale: Data Centres have unique infrastructural requirements, particularly on account of power, land and connectivity. The power demand (critical IT load) of a Data Centre, today, ranges from 15 - 100 MW. To provide a comparison, the average power demand of a district in India is around 500 MW. This huge requirement of power makes it challenging to build a Data Centre in a mixed-use zone or even in an industrial estate, as the power distribution network is generally not designed to meet such huge demand in such area. Further, a Data Centre would require anywhere between 3-12 acres of land and high bandwidth connectivity for its operations.

Considering that these factors require government intervention, it can be efficiently channelized by setting up dedicated Data Centre Parks. These Data Centre Parks will be demarcated enclaves, pre provisioned with the necessary infrastructure, designed to host multiple Data Centres. These parks with its ready infrastructure provisioning should operate on a plug and play model, which can significantly reduce the time required for establishing a Data Centre.

To provide an illustration of the provisioning requirements, let's consider a land parcel of 50 acres. Approximately, 40% of the land (20 acres) would be consumed for common infrastructure (roads/ power substation / water storage). The remaining land of 30 acres will be available for construction. Going by the thumb rule, about 3 to 15 acres of land is required to construct a Data Centre which has a critical IT load of 15 -80 MW. Using this thumb rule, the total critical IT load of the park would be in the range 150 - 160 MW. Considering a PUE (Power Usage Effectiveness) Factor of 1.7, the total raw power requirement of the park would be in the range of 255-272 MW.

For connectivity, at least three different fiber paths with a network capacity of 2-5tbps (terabytes per second) should be available. Multiple fiber paths are required to hedge the risk that arise out of a fiber cut.

These parks should preferably be established by the State Governments through a government agency. The risk of land hoarding by private players and potential re-purposing of real estate for end usage other than support for Data Centre infrastructure needs to be taken into account, if the state governments encourage private players to build and own the parks.

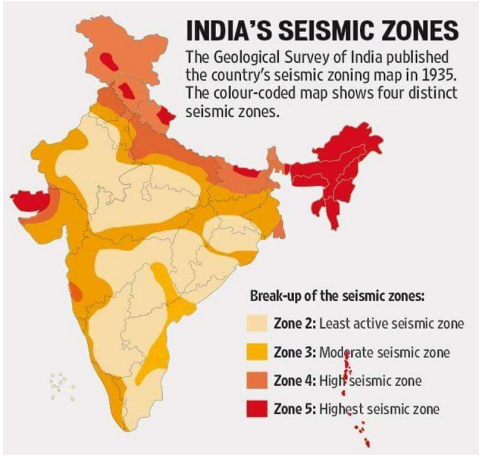
Further, these parks should be located in land parcels that are conducive for the establishment of large scale Data Centres. The factors required to be considered for choosing the site for a Data Centre are listed below.

1. **Land elevation**: A Data Centre located in a low-lying area is prone to risk of flooding. So, land elevation based on 100-year flood plane data should be considered to assess the suitability of the land parcel for hosting a Data Centre.

2. **Air quality**: The air inside Data Centres should meet certain standards in terms of its sulphur content and concentration of Particulate Matter. Sulphur being a corrosive

material could lead to corrosion of the equipment. Sulphur being a conductive material, could lead to short-circuit, damaging equipment.

3. **Seismic zone**: To minimise risk from earthquake, Data Centres should ideally be located in in areas which fall under seismic zone 4 or below. If the Data Centres are located in zones with a higher rating, the buildings would require installation of snubbers (and other materials) to arrest shocks, which will lead to increase in capital cost.



4. Significant separation from High Tension Electricity lines, is required to minimise the impact of Electro Magnetic Fields generated by the lines. For certain equipment used in Data Centres, the permissible limit is close to 3.7 Microtesla [µT] / 37 Milligauss [mG]. Breach of this limit can impact functioning of these equipment.

5. Significant separation and distance from military establishments should be considered to avoid the disruption in connectivity due to jammers installed in military establishments.

6. Data Centres should ideally not be built under a flight path, to minimise risk that emanate from air crash. So, existing flight paths and future paths needs to be taken into consideration.

Recommendation 2: Establish dual power grid networks to ensure uninterrupted supply of electricity to Data Centers

To be actioned by: State Governments / Discoms.

Rationale: Data Centres operate round the clock and their customer contracts, require them to be functional upto 99.995% of time. To meet this target, Data Centres require uninterrupted supply of power. Disruption in power supply is one of the key challenges faced by the Data Centres in India today. To address this issue, power connections should be provided from two different substations. This can ensure that at least one is functional when the other faces a breakdown.

Power cost account for about 30%- 50% of the operational cost of a Data Centre. Though India is the cheapest power producer in APAC Region, the average tariff paid by the customers is higher than countries like China, Vietnam and Malaysia.[17] Considering that there is no sustainable way of providing power at a cheaper price, it is important for the Government to ensure uninterrupted supply of quality power. Therefore, dual power grid networks should be established to supply power to Data Centres. While doing so, determination of fixed cost should be determined based on maximum demand of the consumer without considering the second power connection provided, as only one source will be used at a time.

[17] Deboy Sengupta, 'India is APAC's cheapest power producer' , Economic Times, 19 August 2029; Available at : https://economictimes.indiatimes.com/industry/energy/power/india-is-apacs-cheapest-power-producer/articleshow/70735458.cms

Recommendation 3: Allow Data Centres to consume Renewable Energy procured directly from power producers through the open access system, without any restrictions.

To be actioned by: State Governments / Discoms.

Rationale: In an effort to be environment friendly, some companies have made commitments to use renewable energy (RE) to meet a part of their power requirement, which in some cases, is as high as 80%. Though there is an open access system which allows large consumers to buy power directly from generation companies, distribution companies in many states have put in various restrictions with regards to the contracted capacities of the RE, or banking of RE for use during peak periods, which restrict the ability of CSPs to draw 100 %RE to run their Data Centres. While these restrictions are put in place to maintain grid balance, considering that the power requirement of Data Centres currently form a small proportion of the total consumption, exceptions should be made for Data Centres based on certain criteria, to allow them to consume 100% of the RE procured directly from power producers through the open access system.

Recommendation 4: Allow IP-I companies to share passive infrastructure such as Dark Fibers directly with Data Centres entities in order to establish, maintain and operate an extended "private telegraph" (non-public telecommunications services) between two or more Data Centres in different locations.

To be actioned by: Department of Telecom – Central Government.

Rationale: Cloud service providers ("CSPs") require access to communications infrastructure (including access to passive infrastructure such as dark fibre) to connect two or more Data Centres in different locations. Currently, it is not permissible under Indian law for unlicensed entities such as CSPs to access dark fibre to construct their own private networks and connect their Data Centres (not for the purposes of providing public telecommunications services). CSPs, therefore, are forced to procure all active network services/connectivity from telecommunications services providers ("TSPs"). This restriction hinders the growth of Data Centres in India for the following reasons:

- Services provided by TSPs are significantly more expensive than passive infrastructure such as dark fibre offered by Infrastructure Provider Category-I ("IP-I") companies; which substantially increases Data Centres and CSPs costs.
- TSP services cannot ensure very high availability, bandwidth and low latency for extremely high amounts of data (especially given India's vast geography) and relatively limited existing technology infrastructure and broadband deployment.

Recommendation 5: Enable Data Centre entities to import dual use network equipment for internal use and network infrastructure

To be actioned by: Department of Telecom – Central Government.

Rationale: Currently, Data Centres in India are prohibited from importing certain dual use equipment, even if they do not intent to use such equipment for telecoms services. For example, the import of Dense Wavelength Division Multiplexing (DWDM) equipment and optical switches is restricted, even if the equipment will only be used in a closed-user group,

private corporate network, which does not interconnect with a public network. These restrictions lead to operational challenges and affect the quality and efficiency of Data Centres and cloud services in India.

Recommendation 6: Adopt A Dial Before You Dig Policy (DBYDP), which would allow authorities responsible for carrying out construction work to access information about the underlying network infrastructure before digging.

To be actioned by: NHAI/ State Government

Rationale: The business model of Data Centres and Cloud Service Provider is to build upon a very reliable network, accessible anywhere at any time with 99.999% probability of availability. However, frequent digging of roads due to construction work and lack of coordination between multiple agencies, poses a continuous threat of cable breaks or "hits" to Data Centre operators.

Recommendation 7: Create Common Service Ducts and utility corridors in all new cities as well as State / National highway road projects.

To be actioned by: NHAI/ State Government

Rationale: It is essential that network cables that offers such connectivity are well secure and protected. Providing Common Service Ducts and utility corridors in all new cities and highway road projects, along with efficient and cost-effective mechanisms for infrastructure companies including Data Centres companies to gain access to them will bring down maintenance and repair costs for the companies.

Recommendation 8: Recognize Data Centres as a separate category in the National Building Code.

To be actioned by: Bureau of Indian Standards

Rationale: Currently, the building codes in India do not recognize "Data Centre" as a separate category. So, the building norms of office buildings are applied to Data Centres. Given that Data Centre buildings are primarily designed to host equipment, with limited human entry or movement, these norms are not suitable. For example, the floor load handling requirement of a typical office space would be around 500 kg/sq.ft, whereas for Data Centres it would be between 1250 -1500 kg/sq.ft. The requirements on account of toilet, parking, etc are much lesser for a Data Centre compared to any office space or commercial building. Some of these constraints reduce the spatial efficiency of Data Centres and unnecessarily increase the cost of running Data Centres.

Therefore, given the unique structural requirements, Data Centres, should be recognized as a separate category in the National Building Code with suitable design considerations.

Recommendation 9: Introduce a single window enabled deemed approval system for statutory clearances, at both Central and State level.

To be actioned by: DPIIT / State Governments

Rationale: About 30 different approvals (listed in Annexure 1), are required from central and state governments, before a Data Centre can start operations. While a single window system for statutory clearances exists in many states (21 states as on Dec 2019), no such system exists at the level of Union Government. Further, to prevent delay in these clearances, a deemed approval system with specified timelines, should be introduced both at the Central and State govt. level. Under this deemed approval system, an application would deemed to have been approved, if the government fails to act on the application within the specified timeframe.

Recommendation 10: Provide 'Infrastructure' status to Data Centres.

To be actioned by: Department of Economic Affairs, MoF.

Rationale: Infrastructure status to Data Centres will enable the industry to raise money from insurance companies, pension funds, and international lenders with a longer tenure and on easier terms. This would help bring down the cost of capital. This will also give Data Centres access to cheaper foreign currency funding through the external commercial borrowing route. Given the massive need for capital to establish Data Centres, infrastructure status would help attract investment in the sector.

Recommendation 11: Notify Data Centres as Essential Services under "The Essential Services Maintenance Act, 1968"

To be actioned by: Ministry of Home Affairs

Rationale: Contractual agreements with their customers require Data Centres to be functional more than 99.99% of time. Also, DC's functioning is critical to the operations of institutions they serve. Therefore, declaring Data Centres as *Essential Services* will prohibit strike by their employees and address the operational risk that arise out of strikes. Further, in times of calamity and other crisis, the status of Essential Services could provide the basis for State Governments to consider providing necessary support on a preferential basis.

Recommendation 12: Create an implementation mechanism to implement the above recommendations.

To be actioned by: Central Government

Rationale: While some of the above recommendation are to be implemented by the State Governments, others falls under the ambit of Central Government. Given that all recommendations are important to promote Data Centres, there is a need for creating a joint Centre-State implementation mechanism to ensure these recommendations are implemented.

Annexure 1: Illustrative List of approval / clearances required before commencement of operation

The approvals required to establish a Data Centre facility may have some variations in different states. As an illustration, the clearances required to build a Data Centre in Chennai is provided in the below table.

S. No	Clearance	Authority	Under single window
Statutory Approvals - Pre-Construction Stage			
1	Environment Clearance	Ministry of Environment & Forest (MOEF)	No
2	Consent to Establishment	Metropolitan Development Authority & Central Pollution Control Board (CPCB)	Yes
3	Provisional Fire No Objection Certificate (NOC)	State Fire and Rescue Services / National Fire Protection Association (NFPA)	Yes
4	Storm Water Permits	State Pollution Control Board	Yes
5	Sewage Discharge Approval	State Pollution Control Board	Yes
6	Tree Cutting NOC	Central Pollution Control Board (CPCB) - Forest Department	No
7	Drainage/ Garden NOC	Metro Water Supply and Sewage Board	Yes
8	Building Permit / Approvals	Metropolitan Development Authority	Yes
9	Commencement Certificate	Metropolitan Development Authority	Yes
10	Telecom	Service provider / Controller of Communication Accounts of State	No
11	Water Supply	Metro Water Supply and Sewage Board	Yes
12	Power Connection Feasibility, Design & Sanction	State Electricity Board	Yes
13	Traffic Approval NOC	Commissioner of Traffic	No
14	NOC for High Rise Structure	Airport Authority of India (AAI)	No
Pre-Construction Stage Compliance			
15	Registration with DIC	Director of Industry (DIC)	No
16	Registration IEM	Ministry of Commerce	No

Statutory Approvals - During Construction Stage			
17	220 kV Power connection cable laying from Substation to project premises	State Electricity Board	Yes
18	220 kV Power Connection Substation Testing and Charging	State Electricity Board	Yes
19	Form V Approval - Labour	Labour Department - State Government	Yes
20	Plinth Checking Certificate	Metropolitan Development Authority	Yes
21	Electricity Safety License	Central Electricity Authority (CEA) / Chief Electrical Inspector to Government (CEIG) / Public Works Department (PWD) Electrical Inspector	No
22	Elevator Permits & Certification - Safety License	Central Electricity Authority (CEA) / Public Works Department (PWD) Electrical Inspector	No
23	Diesel Generator System approval	CEIG/ State PCB / PWD-Electrical Inspector	No
24	High Speed Diesel License	Petroleum and Explosives Safety Organisation (PESO) / Chief Controller of Explosives Department (CCOE) / PWD - Electrical Inspector	No
Statutory Approvals - Post-Construction Stage			
25	Lift Operating Licenses	Public Welfare Department - State Government - Lift Inspector	Yes
26	Occupancy Certificate	Metropolitan Development Authority - Fire Department	Yes
27	Completion Certificate	Metropolitan Development Authority	Yes
28	Consent to Operate Certification	Central Pollution Control Board (CPCB)	No
Statutory Approvals- Fire and Explosive			
29	Preliminary Explosive Licence for HSD	Petroleum and Explosives Safety Organisation (PESO) / Chief Controller of Explosives Department (CCOE)	No
30	Final Explosive Licence for HSD	Petroleum and Explosives Safety Organisation (PESO) / Chief Controller of Explosives Department (CCOE)	No