

NDC Shastri Park, Delhi: Power Usage Effectiveness (PUE) achievement

PUE monitors the energy impacts and results in power saving and operational cost. It decreases the electricity consumptions which results in the Data Centre’s power saving. PUE also helps IT professionals in determining the energy efficiency and provides an easy way to measure how efficiently a Computer Data Centre uses energy, especially the energy consumed by computing equipments.



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On order to meet the ever increasing need of high availability and reliability of mission critical applications of the government, National Informatics Centre (NIC) has set up its world class National Data Centre (NDCSP) at Delhi I T Park (Shastri Park, Delhi). The NDC has been designed to provide full stream of hosting services ranging from physical to shared hosting, dedicated servers with managed hosting solutions to infrastructure services such as Collocation & Bandwidth, Disaster Recovery etc. Many of the key applications and web sites of the Central Government Departments as well as various States are hosted at this Data Centre.

Adopting the best practices and international standards, the basic infrastructure management of NDC has been taken care with efficient Asset Management, back-to-back AMC with all vendor agencies and support agreements with software vendors wherever possible. All the services are managed by a dedicated team of NIC

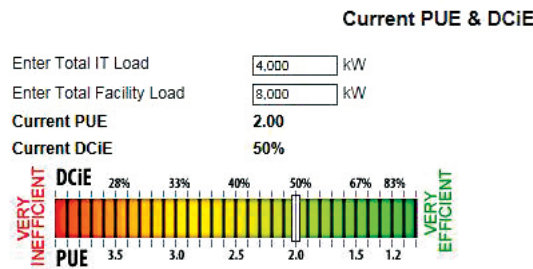
with the use of best of the breed technologies.

The state of the art ICT Infrastructure of NDC includes High end Blade & Rack Servers, Enterprise level Storage Systems and Automated Tape Library Systems for data back up and Network & Information Security. It is powered with efficient physical infrastructure such as redundant UPS systems, Generator sets and enhanced physical security systems. The network connectivity is facilitated through multiple service providers with a high Internet bandwidth of 10 Gbps. Further, staging servers are provided for testing the applications before they are moved to production servers.

POWER USAGE EFFECTIVENESS (PUE)

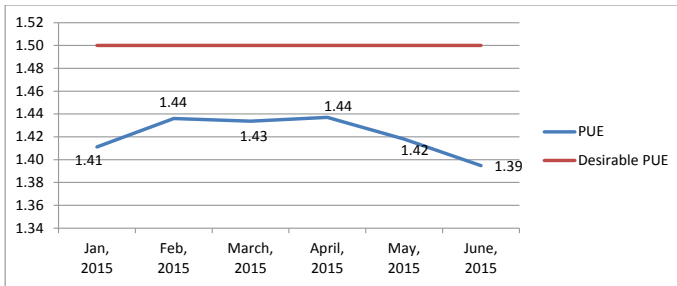
Benchmarking a Data Centre’s energy efficiency is the first key step towards reducing power consumption and minimizing energy costs. Benchmarking enables you to understand the current level of efficiency in a data centre and further helps in gauging the effectiveness of efforts to implement additional efficiency best practices.

$$PUE = \frac{\text{Total Facility Energy}}{\text{IT Equipment Energy}}$$



PUE	DCiE	Level of Efficiency
3.0	33%	Very Inefficient
2.5	40%	Inefficient
2.0	50%	Average
1.5	67%	Efficient
1.2	83%	Very Efficient

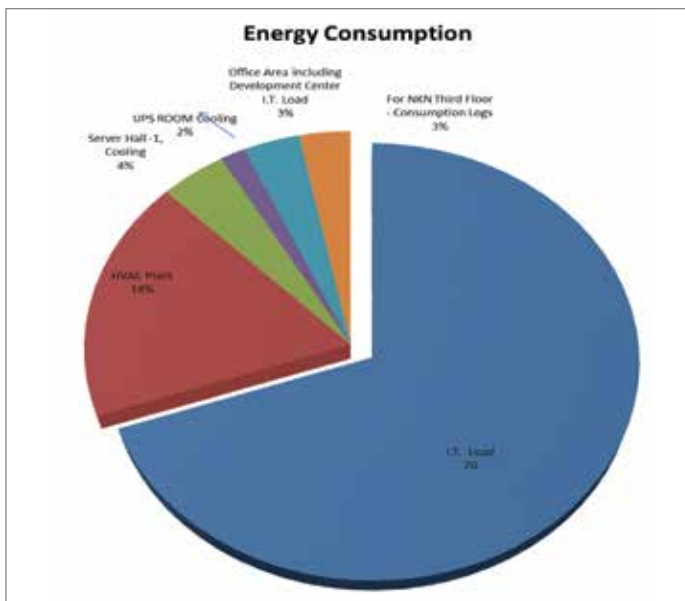
Graph 1: NDC Shastri Park, Delhi - Designed PUE = 1.7 with full load



Graph 2: Current Utilization of Total racks (Phase-I + Phase-II)



Graph 3: Monthly power utilization effectiveness (PUE)



Power Usage Effectiveness (PUE) and its reciprocal Data Centre Infrastructure Efficiency (DCiE) are the widely accepted benchmarking standards proposed by the consortium called ‘The Green Grid’. PUE is a scale to measure how efficiently a Computer Data Centre uses energy, especially the energy consumed by computing equipments (in contrast to cooling and other overhead). It is the ratio of total amount of energy used by a computer Centre facility to the energy delivered to computing machines. PUE and DCiE help IT professionals in determining the energy efficiency of their data centres as well as monitoring the energy impacts.

Anything that isn’t considered a computing device in a Data centre such as lighting, cooling, etc. falls in the category of facility energy consumption.

NDC-SP Basic Infrastructure - Phase-1 with 240 racks was started functioning on July 2011, while the ICT infrastructure with about 110 rack servers & 6 storage racks was started in September 2011.

Initial PUE monitored from Nov.2011 to Aug 2013 for Phase-1 is shown in graph below.

NDCSP PHASE-2 WITH ADDITIONAL 240 RACKS WAS STARTED IN SEPTEMBER 2013.

Following are the additional best practices implemented for improving PUE:

Data Centre Efficiency:

1. Enhancing UPS Power Redundancy: UPS Configuration has been converted for both Phase-1 and Phase-2 from 2(N+1) to (N+N) i.e. 100% redundancy.
2. Providing Blanking Panels in Server racks: This has reduced mixing of cold air with hot air.
3. Temperature of cold aisle increased from 20 degree to 22 degree.
4. Continuous monitoring & timely preventive maintenance of all basic infra equipment.

With the above implementations, there has been a substantial improvement in PUE at NDC, which resulted in power saving and operational cost. PUE for the duration of 6 months i.e., January to June 2015 is as shown in the graph 2 above:

As per the design of NDC, the desired PUE is 1.7 at 100% load. The basic infra operations team of NDC has made an effective improvement in this by bringing the PUE to 1.39 even at 60% of current load. This was achieved by gradually increasing the temperature inside the data centre and saving of chilled air by bridging gaps of hot and cold aisle containment, enhancing UPS Power redundancy, continuous monitoring and timely preventive maintenance of all basic infra equipments.

This is considered as a major achievement especially because of the efforts for decreasing the electricity consumption, which resulted in the Data Centre’s power saving considerably.

For further information:

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