




### Roadmap ...

- ✓ The Development Process And Events
- ✓ Key considerations & Focus Areas
- ✓ The Challenges faced
- ✓ Brief Summary Of The Electrical Chapter
- ✓ Concluding Thoughts




### The Development Process And Events

- ✓ 1<sup>st</sup> Core Group Meeting : 19<sup>th</sup> Feb'09
  - Set-up a systematic approach to pick-up the components in electrical distribution of Datacenter
  - Discussed on the components & Identified the key contributors to Energy Saving
  - Members volunteered to contribute in collecting and submitting confirmed data on these key components, relevant case studies and best practices
  - CII embarked on the task of visiting Datacenters across the country and keenly observing them



### The Development Process And Events

- ✓ 2<sup>nd</sup> Core Group Meeting : 8<sup>th</sup> June'09 and Between the 1<sup>st</sup> & 2<sup>nd</sup> Core Group Meetings
  - Members contributed with Data, case Studies and white papers
  - CII collated those data, visited Data Centers across the country and made significant observations
  - These were tabled in the 2<sup>nd</sup> Core Group Meeting and discussed among members present
  - The Members & CII short-listed specific Case Studies & Best Practices and decided to gather more Data





### The Development Process And Events

- 2nd Steering Committee Meeting : 3<sup>rd</sup> July'09 and during the interim period

The Data and case Studies were tabled and discussed; Observations and suggestion of members were noted

CII brought-out the first-cut Manual and invited comments from all members



### The Development Process And Events

- Beyond 3<sup>rd</sup> July till Publishing of Draft Manual

The members and CII worked hard to put-into place a Cohesive and fairly comprehensive Electrical Chapter

BEE-CII came out with the Draft copy of the Manual in its final form including the Electrical Chapter

A final proof-reading was done and any error sighted was corrected.






### Key Considerations & Focus Areas

A Typical Electrical Distribution Single Line Diagram was used to systematically identify and focus on Key Components

Adopted a 80-20 method to identify and focus on the key contributors to Energy Efficiency – 20% components having potential of saving 80% Energy



Transformers, DG Sets, UPS's, Optimal Sizing & Selection of Cables/Bus-Bars, Type of Lighting, Usage of Filters, Planned Distribution through PDB's and Energy Economisation through intelligent Loading were identified as Key Focus Areas

### Key Considerations & Focus Areas

One of the Key considerations was to focus on those options and methods which lead to substantial Energy Saving without compromising on Reliability & System Performance

More Focus has been on the effective means of reducing Kilowatt consumption (hence, also reduced heat loss).

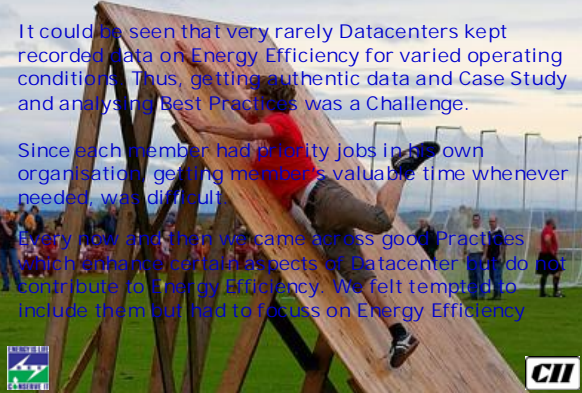





### Challenges Faced

It could be seen that very rarely Datacenters kept recorded data on Energy Efficiency for varied operating conditions. Thus, getting authentic data and Case Study and analysing Best Practices was a Challenge.

Since each member had priority jobs in his own organisation, getting member's valuable time whenever needed, was difficult.

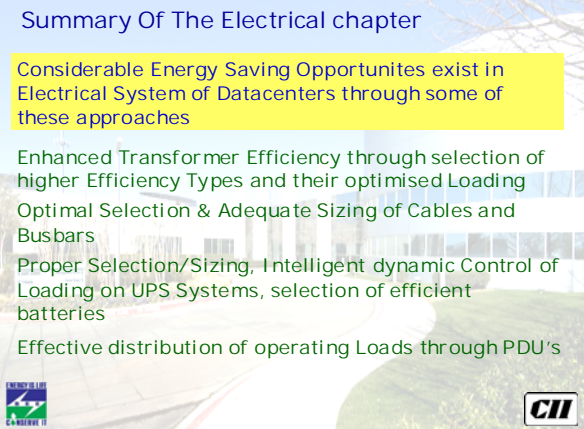


Every now and then we came across good Practices which enhance certain aspects of Datacenter but do not contribute to Energy Efficiency. We felt tempted to include them but had to focus on Energy Efficiency.

### Summary Of The Electrical chapter

Considerable Energy Saving Opportunities exist in Electrical System of Datacenters through some of these approaches

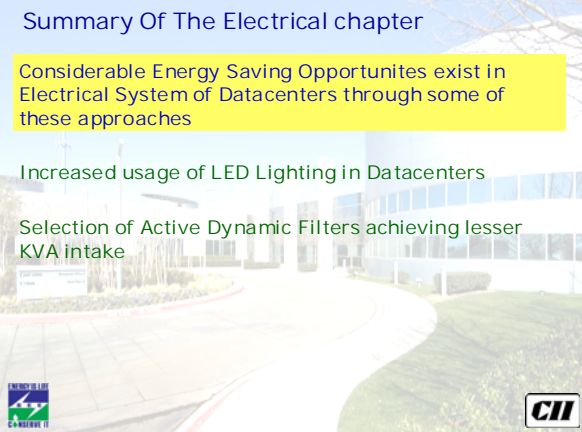


- Enhanced Transformer Efficiency through selection of higher Efficiency Types and their optimised Loading
- Optimal Selection & Adequate Sizing of Cables and Busbars
- Proper Selection/Sizing, Intelligent dynamic Control of Loading on UPS Systems, selection of efficient batteries
- Effective distribution of operating Loads through PDU's

### Summary Of The Electrical chapter

Considerable Energy Saving Opportunities exist in Electrical System of Datacenters through some of these approaches

- Increased usage of LED Lighting in Datacenters
- Selection of Active Dynamic Filters achieving lesser KVA intake

### Concluding Thoughts

There is no Single Perfect Solution which can be called Right and the others Wrong. Based on the availability and constraints, configuration of the system and the Mutual efficacy of them works.

The Electrical Chapter is just the beginning of A Journey toward striving for Saving Nation's wealth in data centers.

Thank You

It's been nice to see stalwarts of different organisations come together for the greater cause of the Nation. Let's continue the process for us, for our Nation.

