Minutes of the Meeting:

2nd Advisory Group Meeting, 17 July 2019, Hotel Taj West End Bengaluru

A Joint Initiative of CII-IGBC and LBNL, USA for
"Enhance Energy Efficiency in Indian Green Data Centers"

Members attended the advisory group meeting:

1. **Mr Syed Mohamed Beary,** CMD, Bearys Group & Chairman, IGBC Bangalore Chapter
2. **Mr PC Lohia,** Senior VP, HVAC, Reliance Industries Ltd & Chairman, IGBC and LBNL Taskforce – 'Chiller'
3. **Mr Pritam Goyal,** GM, Vodafone Idea Ltd & Chairman, IGBC and LBNL Taskforce – 'Electrical Systems'
4. **Mr Raghuveer Singh**, Director – Thermal Management, Vertiv Energy Private Ltd & Chairman, IGBC and LBNL Taskforce – 'Data Centre Cooling'
5. **Mr Vivek Rajendran,** Director, Software Engineering, Dell EMC & Chairman, IGBC and LBNL Taskforce – 'IT Hardware and Software'
6. **Mr Angelo Barboza,** GM & Head APAC Region, Rittal India
7. **Mr Biju Jacob John,** AVP – Solutions Engineering & Bids Management, Solutions Engineering, Netmagic (An NTT Company)
8. **Mr Chaitanya Tamhankar**, Legrand
9. **Mr Hiren Shah,** Sr Manager, Reliance Industries Ltd
10. **Dr Kanwal Sujit,** CEO, Terralive Environ Tech Pvt Ltd
11. **Mr Kiran A J,** Regional Manager – Infrastructure, Infosys, Bangalore
12. **Mr Mallikarjun V Patil,** CEO, Apt Data Center Consultants India LLP
13. **Mr Manoj Kapil**, Practice Head – Data Centers and O&M Services, Wipro Ltd.
14. **Mr Mario Dias**, Manager-Fac Operations, Workplace Resources, NetApp
15. **Mr Mahesh Trivedi**, Data Center Expert
16. **Mr N K Singh**, Senior Director, Business Development - South Asia, Uptime Institute
17. **Mr Pankaj R. Wadhwa,** Managing Director, Vastunidhi Architects
18. **Mr Rajkumar Kambar**, DC Manager Asia – Intel
19. **Mr Ranvijay Roy**, Consultant, Wipro Limited
20. **Ms Shalini Singh**, Real Estate and Workplace India, VMware
21. **Ms Shatakshi Suman**, Assistant Project Manager (ECBC), BEE, Govt. of India
22. **Mr Shashi Bhushan Prasad**, Vice President - Projects, STT GDC
23. **Mr Shekhar Dasgupta,** Founder, GreenField Software Private Ltd.
24. **Mr Shrirang Deshpande**, Country Head-Data Center Business (India), Vertiv Energy Pvt Ltd.
25. **Mr Shubham Agarwal**, Manager, Green Initiative, Infosys, Bangalore
26. **Mr Siddharth Jain**, Managing Director, epi-India
27. **Mr Vinit Gupta,** Country Head Marketing, Numeric

CII-IGBC and LBNL:

28. **Mr Dale Sartor**, Staff Engineer, LBNL, US
29. **Dr Shivraj Dhaka,** Counsellor, CII GBC
30. **Mr Himanshu Prajapati,** Engineer, CII GBC
31. **Mr Yasin Khan,** Associate Counsellor, CII GBC

Inaugural – 2nd AGM:

Mr Syed Mohamed Beary welcomed all the advisory group members and thanked LBNL for their support in driving energy efficiency in Indian data centers. He then requested all members to introduce themselves. Members appreciated the collaborative efforts of IGBC and LBNL on this initiative. Mr Beary highlighted the growth in Data Centre industry and the role of digitalization and e-governance which will further boost the need of resource efficient Data Centers. Further, he informed that several big developers have already started investing on large scale Data Centers to fulfil future needs.

Group photograph – 2nd Advisory Group Meeting 2019, Hotel Taj Westend Bangalore

Later, Dr Shivraj Dhaka made a presentation and highlighted the key activities conducted from July 2018 to July 2019. He further mentioned that during the workshops, ECBC User Guide for Data Centers was introduced and industry experts shared their knowledge on innovative design & retrofitting carried out for enhanced energy efficiency. Dr Shivraj requested committee members to support in developing case studies. Mr Dale Sartor updated all the members about the activities carried out on Energy Efficiency in Indian Data Centres during the Phase-I, Phase-II and ongoing Phase-III. Mr Dale highlighted some of the areas where the committee needs to have consensus-based recommendations. Before start of technical discussions, Mr Beary handed over the 'Path of Green' written by Late Dr Prem C Jain, Chairman, IGBC to Mr P C Lohia, Mr Pritam Goyal, Mr Raghuveer Singh, and Mr Vivek Rajendran for their immense contribution in the development of User Guide and leadership in chairing the Taskforce.

Deliberations on ECBC 2017 User Guide for Data Centers:

Mr Dale Sartor invited Task Force Chairs to present on recommendations proposed by the committee members and requested advisory members to share their comments in case of any difference in opinion based on their domain expertise in Energy Efficiency in Data Centers.

Mr P C Lohia presented on 'Chiller' and explained in detail the basis of recommendations. Following points were discussed during his presentation:

1. The group suggested to specify stringent conditions for ECBC compliance for air cooled chiller, water cooled chiller and cooling tower. The group felt that even in existing Data Centres minimum benchmark is easily achievable.

2. Mr NK Singh recommended to use integrated approach in evaluating Data Centre performance instead of following equipment level specifications for level-I, II and Level-III. He further suggested to use PUE as a key indicator for successfully implementation of ECBC 2017 in data centres. Mr Pankaj Wadhawa also stressed to follow the integrated approach.

3. Mr Shashi Bhushan recommended to derive system level performance while following component level efficiency specifications.

4. Mr Rajkumar Kambar suggested to define compliance pathway for multi-use buildings wherein the Data Centre is being cooled by the chiller catering to building load.

5. Mr Vivek Rajendran and few other members suggested to follow ECBC, ECBC+ and SuperECBC to show performance instead of Level-I, Level-II and Level-III.

6. Several members recommended to use separate chiller for DC project wherein IT load is more than 500 kW.

7. Mr Hiren Shah stressed to follow Chiller plant performance (4-zone performance)

8. Ms S Suman briefed to use India specific testing/ rating for Chiller instead of AHRI.

Mr Raghuveer Singh presented on 'Cooling in Data Centers" and explained in detail the basis of recommendations. Following points were discussed:

9. Mr Raghuveer Singh discussed that committee shall advise on use of EC fan (variable) and EC fan control for compliance paths. In CRAC, use EC fan for levels (I, II and Level-III)

10. In Air Management (Level-I), define the requirement for hot aisle and cold aisle containment and include remark to exclude hot/ cold aisle containment for RDX and liquid/ chip cooling or similar cooling technologies.

11. In Air Management (Level-II), define level of mixing and rise in temperature. Members suggested to derive examples to showcase the level of mixing /temperatures for Level-II (3.6 °C) and Level-III (1.8 °C). Define tips and include best practices. Mr Shashi recommended to have mixing level 1-2 °C. Further, members asked to define measurement locations and also to define whether 3.6°C is a result of mean/ average/ maximum temperature recorded in one or several iterations (consider worst case scenario). Mr Mahesh Trivedi mentioned to include time period and frequency.

12. Sub-group formed to address issues on air management (Mr Manoj Kapil, Mr Shubham Agarwal, Mr Mahesh Trivedi, Mr Shashi Bhushan and Dr Kanwal Sujit).

13. Members recommended to keep the fan control common for all three levels.

Mr Vivek Rajendran presented on 'IT Hardware and Software" and explained in detail the basis of recommendations. Following points were discussed during his presentation:

14. Members recommended to have server level monitoring instead along with rack level (conventional system).
15. Refresh rate to be included in the User Guide explaining energy efficiency in DCs.
16. Include examples to describe processor generation (n-2, n-3, best practices to be included for the IT usage). Matrix to define age of IT hardware.
17. Define CPU % utilization over time, shall be measured as mean or average.

Mr Pritam Goyal presented on "Electrical Systems" and explained in detail the basis of recommendations. Following points were discussed during his presentation:

18. Members strongly recommended to include specifications of rotary UPS along with tips on classification of UPS.
19. Further, it was advised to define UPS kW/loading for ECBC+ and SuperECBC.
20. Reduction in efficiency, (3% owing to THDi). Also include tips on it.
21. Member discussed on PUE metering & monitoring for all three levels. Sub-group formed to conclude on the PUE measurement methodology.
22. Members had discussed and suggested to recommend regionalised PUE values (members of sub-group: Mr Ranvijay Roy, Mr Vivek Rajendran, Mr Chaitanya Tamhankar, Mr Pritam Goyal, Mr Shubham Agarwal, Mr Sriram Deshpande and Mr John Booth).
23. On DG sets members discussed about the star rating however, Ms Suman mentioned that BEE will soon announce more details on star rating for higher capacities DG sets.

Conclusion:

To have continuous engagement with all the members and develop consensus based recommendations, Dr Shivraj requested the members to share comments on user guide, if any by end of July (already comments have been received). Also, it was decided to conduct sessions on IT Hardware and Software (inhouse for DC projects or group of projects). This would help DC teams to explore ECBC 2017 and user guide for DCs.

Mr Dale Sartor thanked everyone for their support and contribution in the Guide. Mr Dale further requested committee members to support in developing case studies, to showcase energy efficiency measures implemented in DC projects.