



LIGHT

the official

NEWSLETTER

of the Indian Society of Lighting Engineers

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Printed & Published by Mr. Harcharan S. Mamak, A 448, Defence Colony, New Delhi 110 024 on behalf of Indian Society of Lighting Engineers and printed by him at Graphic Point Pvt. Ltd., WZ-429 B, Naraina Village, New Delhi.

FROM THE PRESIDENT'S DESK

The next quarter is going to be an exciting and action packed time for us at ISLE.

First in mid September, we have the Lii2013 Exhibition and Conference at Chennai which has attracted a number of first time international exhibitors. For the Conference a high level Steering Committee headed by India's green building guru, Dr. P.C. Jain has organised an interesting programme with an interesting mix of panel discussions and paper presentations. The event is being supported by Lux Pacifica and we will have the Chair, Lux Pacifica, Dr. Warren Julian with us during the event. I look forward to catching up with many of you there.

For those of you who have not booked stalls, this is your last chance to be present at the only international lighting fair in South India.

It is also the last chance for those who would like to make use of the opportunity to appear in the Indian Lighting Directory through an advertisement or entry. I would like once again to request members to help in making this publication more successful with a wider representation.

At the end of September we have an intensive course on solid state lighting conducted by LRC at Bangalore and Delhi. For those of you with an interest in this field I would suggest you enroll immediately as the participants will be limited to about 30 to enable maximum interaction.

And then in October, Prof. Wout van Bommel, Past President CIE will come to India for five weeks, first to conduct a course for the students at KIIT Bhubaneswar and subsequently to run two workshops in Kolkata.

The State Centres have also planned events during the last quarter and provide opportunities for spreading the message of good lighting practice in India which is the principal mandate of ISLE.

Gulshan Aghi
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Never before in the history of electrical lighting has there been a technology change that offers so much promise as the present introduction of Light Emitting Diodes (LEDs). The advantages of this tiny light source are many fold covering energy conservation, flexibility, adaptability, high lumen packages, and also are environment friendly. As with any change it is important for all practitioners of lighting to be fully aware of the different facets and consequences of this change. This is particularly relevant to large users where decisions need to be based on an understanding not only of the technology but also of the design requirements.

This issue carries details of the intensive 2 day course on solid state lighting being run at Bangalore and Delhi by the LRC. It will be evident from reading this that it will not be just another of the LED talk fests that are being put together from time to time, but a thorough insight into this technology and its applications by experts who have been at the leading edge of the developments in this field. They are also experienced in imparting this knowledge to opinion leaders, decision makers and practitioners of lighting. Members should take advantage of this opportunity.

We also carry Prof. van Bommel's talk at the CIE Centenary on behalf of the CIE Past Presidents on the achievements of CIE and of its relevance to the general public or as he chooses to call it "the normal world". It reinforces the conviction that there is a pressing need for societies like ours that work to ensure that the benefits of lighting technologies reach everyone.

Two of our members have been honoured and recognised for the work they have been doing. You will find brief reports on the awards given to Dr. Biswajit Ghosh and Mr. M.S.N. Swamy.

There is also a call from ISA for entries to its Global SSL showcase in which they select the top 100 projects for worldwide exposure. In case there is any project you would like to enter please contact us immediately.

As we do every year, we have reproduced some of this year's IALD award winning projects to share outstanding lighting projects with our readers.

H.S. Mamak
Editor

NEW MAILING ADDRESS

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Exhibition

India's largest and brightest lighting fair under the banner Light India International 2013 (Lii2013), organised by the Indian Society of Lighting Engineers (ISLE) has been programmed at the Chennai Trade Centre during 13th to 16th September 2013. A concurrent show on solar lighting and allied accessories is an added attraction.

The main stakeholders to benefit are manufacturers, importers of lighting equipment, R&D institutions, Builders, Electrical Contractors, Architects, Lighting Designers, Interior Designers, Hospitality industry engineers and The knowledgeable general public. Over and above the showcasing of a wide range of products over 16500 sq meter area to cover each and every application such as industrial lighting, retail lighting, architectural lighting, solar lighting etc., Lii2013 will also publicise the developments taking place in the lighting industry. Technology up-dation through a specially organised International Technical Conference on "Emerging Concepts for a Greener World" is expected to be a gathering of international stalwarts.

Lii2013 has been approved by ITPO and "India Mart" are the title sponsors. Over and above the Indian companies and repeat participants, noteworthy among the foreign companies who have now opted for first time participation are:

Trilux/Germany, BJB/Germany, Narava/Germany, Light Tape/USA, Bridgelux/USA, NVC/China, Neo Neon /China, Edison/Taiwan, Ledlink/Taiwan and Ledionopto/Taiwan

Fair Timings

Business Hours

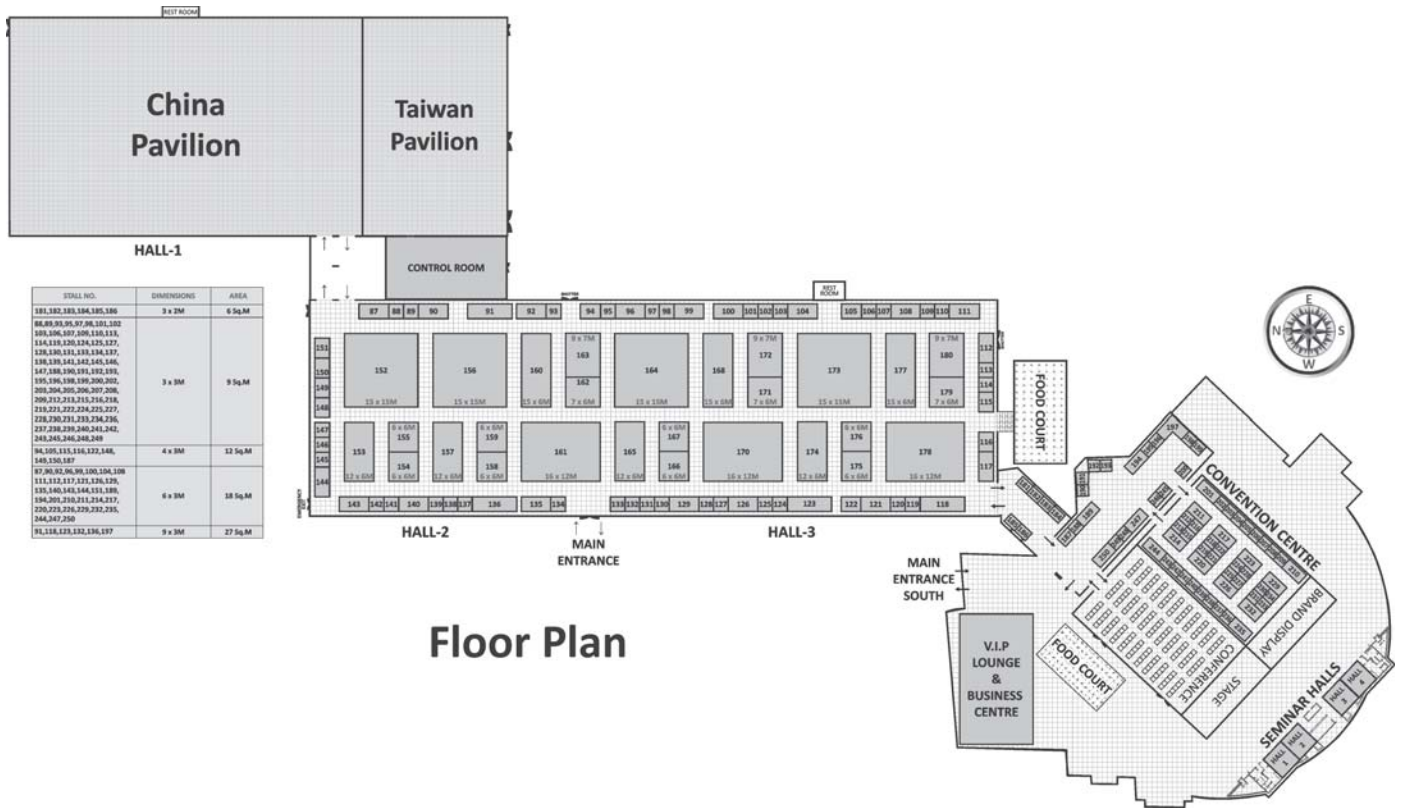
13.9 and 16.9 : 10.00-15.00
14.9 and 15.9 : 10.00-13.00

Public Hours

13.9 and 16.9 : 15.00-19.30
14.9 and 15.9 : 13.00-19.30

Conference

Since the launching of the event six months back, the event has generated wide spread interest among lighting



Floor Plan

professionals and has attracted participation response from many companies engaged in the field of lighting.



Messrs. A.K. Jain, Gulshan Aghi, Dilip Kumbhat and P.C. Jain at the Steering Committee meeting in Delhi on July 30

Lii 2013 will cover all segments of lighting.... * Residential, Commercial & Retail lighting * Industrial lighting * Street lighting * Security lighting * Environmental/Landscape lighting * City Beautification lighting * Architectural lighting * Railway / Metro lighting * Airport & Railway lighting * Refineries / Mines lighting * LED lighting * Intelligent lighting * Lighting with non-conventional energy * Speciality lighting * Lighting accessories & controls * Power saving solutions * Testing, Measuring Instruments * IT, Publications, Consultancy services relating to lighting industry.

Lii 2013 will not only highlight the latest, but will also focus on the emerging trends in all segments of lighting.

Technical sessions have been planned concurrent with the show at the Convention Centre, Chennai Trade Centre

13th September

- 10.00 : Inauguration
- 13.00-16.30 : Product presentation by select participants
- 17.00-18.30 : 'A' Grade Electrical Contractors Association meet
- 18.30-20.00 : Cultural meet - Sponsored by Hybec

14th September

- 10.00-17.30 : International Technical Conference on "Emerging Concepts for a Greener World"
- 18.00-20.00 : Cultural meet - Sponsored by BAG Electronics

15th September

- 10.00-11.30 : Get together of Engineers of Public Enterprises
- 11.30-13.00 : Get together of BUILDERS
- 14.00-17.00 : Meeting of the Tamil Nadu Electrical Wireman and Licensed contractors
- 18.00-20.00 : Cultural programme - Sponsored by Vel Tech Engineering College

16th September

- 10.00-12.00 : Students competition on "Green Lighting"
- 3.00-16.30 : Architect meet
- 17.00 : Valedictory Function

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Directory 2013

Since its inception in 1991, the Directory of the Lighting Industry in India has always covered contemporary concerns such as energy conservation, lighting standards, environment and health, sustainability and the green movement. In brief, the Lighting Directory has served as a reference book to the lighting industry and many associated with it for 21 years. The overwhelming response that the 7th edition, which was released in October 2012, has received from the lighting fraternity has compelled us to turn the directory into an annual publication and the next edition, renamed 'The Indian Lighting Directory', will be released in October this year.

The directory attempts not only to list the organisations, manufacturers and dealers in the field of the Lighting Industry, but also provide a deep insight into the phenomenal progress that is being made in the field of lighting. The lighting industry in India is witnessing a robust 100% growth. The sector is projected to grow to Rs 20,000 crore in the next 5 years.

Keeping in mind the rapidly changing scenario in lighting, we feel that the Directory is an ideal platform to advertise and be seen in. The directory is a very useful reference book to locate key persons in the field of lighting. It is also an authentic source of information on different aspects of lighting and the developments taking place.

The Directory has not only served as a reference for new entrants to the lighting industry but also in the selection of vendors and raw material suppliers. In fact, the biggest demand for the Directory has come from emerging industries searching for marketing their goods and services.

The recipients of this publication include specifiers, architects, consultants, decision makers from government and industry, large users, academicians etc. The Directory is also distributed internationally.

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ISLE LRC Course on Solid State Lighting **Bangalore** September 23 and 24, 2013 **Delhi** September 26 and 27, 2013

The Indian Society of Lighting Engineers (ISLE) in association with Lighting Research Center (LRC) USA is pleased to present an interactive workshop conducted by

the Lighting Research Center (LRC) focused on solid-state lighting, for lighting professionals in India. The workshop will be designed to increase attendees' knowledge and awareness of energy-efficient solid-state lighting technologies, application, and design strategies. Also it allows for information exchange on the latest LED developments; LED product characteristics and performance needs for successful lighting applications in commercial buildings, indoor and outdoor, in India; and LED lighting standards and recommended practices in the US and India. The workshop is supported by the Bureau of Energy Efficiency (BEE) and the U.S.-India Joint Center for Building Energy Research and Development (CBERD).

A lighting manual will be developed summarizing the information discussed and provided in the workshops and giving participants a variety of tools to assist them to better select and apply solid-state lighting systems. The LRC in association with ISLE Delhi will award continuing education credits and provide a continuing education certificate to each attendee of the course. Specific topics to be included in the workshops include:

The Language of Lighting and Standardized Terminologies for LED Technology

Designers, specifiers, and manufacturers within the lighting industry, both in India and the US use unique terms and concepts, which have evolved into professional usage over a period of time and have been officially defined by professional bodies. These terms represent important concepts in the practice of lighting which presenters will review to assist seminar participants to better understand the field of lighting. Presenters will also discuss standard terminologies used when describing LED device and systems.

Solid State Lighting Technology

Presenters will review the latest advancements in solid-state lighting technologies focused on LEDs (light emitting diodes) typically used in commercial lighting applications. Presenters will also review important information on system components including optical, thermal, mechanical, and electrical sub-systems. Participants will be taught how to evaluate these technologies for quality, energy efficiency, and compatibility. The objectives of this course section are to assist the participants to:

- become aware of LED lighting products (e.g., replacement lamps, fixtures) as adopted in the US including those listed in the Energy Star program
- understand the operating characteristics of solid-state technologies
- be able to compare technologies and evaluate factors that will affect their performance

- be able to select among available solid-state lighting products to choose those that best meet an identified lighting need
- provide information on current needs for LED products and market barriers for LEDs in India.
New Lighting Metrics

The session will focus on new and emerging metrics and evaluation criteria in the field of lighting including those metrics which better quantify the benefits and value of lighting to the end user. This will include new metrics on energy efficiency, brightness, nighttime vision, sense of safety and security, color, daylighting, and other areas. This will also include a discussion of current lighting metrics used in India and feedback from workshop participants on how these new proposed metrics would be received by lighting specifiers in India.

Vision, Photometry and Colorimetry

Photometry and Lighting Measurement – Presenters will review metrics and measurement techniques and guidelines focused on the evaluation of solid-state lighting products and systems used in the US and will gather information from program participants on measurement guidelines and requirements used in India. This will also include a discussion of similarities and differences between measurement guidelines used in India and the US.

Light and Color – Color is an important issue with solid state lighting systems. Traditional color metrics do not work well in describing the color properties of these new light sources. This session will include information on light and color including correlated color temperature of light sources, color rendering metrics, spectrum, color and the human visual system, and other application issues dealing with light and color.

Lighting Design and Application

Presenters will review recommended practices and important issues in lighting application and design for commercial and industrial, interior and exterior settings. This session will address important considerations in lighting design, and the design process for both interior and exterior applications. Content will include such issues as client requirements, human needs, architecture, energy-efficiency, technology integration, lighting control, and life-cycle costs. This session will be designed to allow participants to:

- understand the lighting requirements of interior and exterior spaces, including appropriate siting of lighting equipment and daylight availability analysis
- establish appropriate lighting criteria for efficient space utilization, task performance, and energy utilization
- develop designed illumination and lighting control systems, including fixture selection and design, and light source selection

- discuss current lighting design criteria and recommended practices in India and compare those to criteria in the US.

Lighting Products Indian Specifiers Would Like to See

This interactive workshop and discussion session will include information on current LED lighting products and market interests and will seek information from participants on what types of products are desired by Indian lighting specifiers.

LRC

The Lighting Research Center (LRC) is the world's largest university based research and education institution dedicated to lighting. It employs an expert staff of more than thirty five researchers, educators, designers, and scientists dedicated to “advancing the effective use of light and thereby creating a legacy of positive change for society and the environment.” The LRC is part of Rensselaer Polytechnic Institute, the oldest technical university in the United States located in Troy, New York.

The LRC's world-renowned staff includes some of the leading vision and lighting scientists, engineers, physicists, designers, and energy-efficiency experts, who have been studying lighting for much of their careers. Their research has led to unique and innovative solutions that improve the visibility, efficiency, comfort, and safety of lighting installations.

Presenters

The following team of LRC faculty and staff will develop and present the workshop.

N. Narendran, PhD, FIES — Dr. Narendran is a professor and director of research at the LRC. He is well known throughout the lighting industry for his pioneering research and educational activities in the field of solid-state lighting. Dr. Narendran leads a team of researchers and educators in the area of solid-state lighting at the LRC, and conducts research and educational programs to accelerate the development and market transformation of this promising technology. Dr. Narendran has authored or co-authored more than 100 articles in archival journals and proceedings and holds several patents.

Russell Leslie, AIA, FIES, LC — Professor Leslie is the associate director of the LRC, a practicing architect, and an expert in energy-efficient lighting design. His research areas include residential lighting, outdoor lighting, daylighting, energy, architecture, and building systems integration. He is the project architect for over one hundred architectural projects and planning studies. His publications include the award-winning *Lighting Pattern Book for Homes* and the *Outdoor Lighting Pattern Book*.

Daniel Frering, LC — Professor Frering is currently the manager of education for the LRC where he directs the education programs including teaching, and course and curriculum development. Mr. Frering holds a graduate degree in education specializing in educational curriculum development, and has also studied lighting as part of the Master of Science in Lighting program at the LRC. Mr. Frering teaches courses and seminars in lighting technology, daylighting, control systems, and lighting applications.

Jean Paul Freyssonier, MS, LC — Professor Freyssonier serves as a research scientist at the LRC. His work includes the design and evaluation lighting applications and demonstrations and he also conducts research projects in the area of solid-state lighting technologies. He has been involved in the design and development of several types of LED lighting systems including a low-profile LED luminaire, control systems, and lighting systems for residential applications. His lighting experience includes working as principal of design in a full-service architectural lighting and automation design firm.

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CALCUTTA STATE CENTRE

National Workshop on Solar Power

May 4-5, 2013, Kolkata

ISLE Calcutta State Centre joined hands with the Solar Energy Society of India to sponsor a workshop on Solar Power Tomorrow's Major of Electricity organised by the School of Energy Studies at Jadavpur University.

Those present from Jadavpur University included Prof. S. Bhattacharyya, VC, Prof. S. Dutta Pro VC, Dr. P.K. Ghosh, Registrar and other senior faculty members and from SESI Prof. D. Mukherjee. The dignitaries present included Mr. R.N. Sen, Chairman DVC, Mr. M.K. Dey, Principal Secretary Power, Govt of W.B. and Mr. Syamal Gupta, Special Advisor, Tata International. Mr. Kamal Sethia, Chairman Calcutta State Centre was accompanied by the following ISLE members; Mr. H. Mukherji, Mr. T.K. Ghosal, Mr. Pinaki Roy and Prof. Saswati Mazumdar.



Dignitaries on the dais

The aims and objectives of the workshop were elucidated by Prof. S. Dutta, Pro VC JU. In his presentation, Mr. R.N. Sen, Chairman DVC, enlightened the audience on the need for "Solar Power, power industries perception."

Mr. M.K. Dey explained the policy and planning in renewable sectors as outlined by the Government of West Bengal. After the inauguration by the dignitaries, Mr. Syamal Gupta was felicitated by Prof. S. Bhattacharyya and Mr. Kamal Sethia for his outstanding contribution to solar photovoltaic power and his vision for the future development of India. Prof. S. Bhattacharyya delivered the presidential address. The vote of thanks was given by Prof. Biswajit Ghosh, Organising Secretary of the workshop.

The Key note lecture on the "Indian Initiative on Harnessing of Solar Power" was delivered by Mr. Syamal Gupta. (see page 21)

The following technical sessions were conducted during the two day workshop.

Dr. P. Banerjee SES, JU. Technology for fabrication of PV cell & module

Prof. D. Mukherjee, BESU, Howrah. Solar PV cell & design procedures.

Mr. Saikat Roy Chowdhury, Pulse Power. PV balance of system

Mr. S.Ganguly, Vikram Solar, Kolkata. Off grid & On grid PV system: Industries outlook.

Mr. Manik Mondal, AMC Battery, Kolkata. Storage battery for PV system.

Mr. Vineet Rohatgi, Binay Opto, Kolkata. Field experiences of a grid connected PV system

Dr. T. Jash, SES, JU CDM for renewable energy system.

Mr. R. Mondal, SES, JU Failure mode analysis of PV Power system

Mr. T.K.Ghosal, Hon. Secretary ISLE CSC, representatives from academic institutions, industries & NGOs Celebration of international Sunday and panel discussion on role of solar power in Indian power budget.

Dr. S. Neogy, SES, JU & Prof. S. Mazumdar SISED, JU Students' poster presentation

Mr. H. Mukherjee, ISLE, CSC, Mr. T.K. Ghosal Hon. Secretary ISLE CSC, Secretary SESI (ER) and Prof. D. Mukherjee, BESU, Howrah, Valedictory & certificate distribution ceremony.

MUMBAI STATE CENTRE

Lecture on Lighting for Business

February 14, 2013, Mumbai

In its second interaction with the students of Sardar Patel College of Engineering, Mumbai State Centre organised a lecture on Lighting for Business by Mr. Stan Alvares, Hon. Secretary ISLE MSC.



Mr. Stan Alvares and Mr. Amal Auddy with some of the students

The lecture gave the students an understanding of the importance and application of lighting in various facets of life. Starting with Light at study, play, entertainment, festival, city and at work it demonstrated how light surrounds all parts of our lives bringing a sense of joy, safety and energy in all that we do. The theme of good lighting as an art and science was explained through various examples. This was followed by an overview of light sources and their appropriate selection with a small introduction to basic lighting design.

Breakfast with Light 11

April 28, 2013, Mumbai

The 11th in the Breakfast with Light series featured Mr. Kaustabh Nandurbarkar who made a presentation on Understanding Light - A Qualitative Aspect of Lighting Design.

Mr. Nandurbarkar explained the qualitative aspects of illumination science and the need to understand Light as a medium, which connects humans and animals to the environment. The entire presentation was done in four parts:

Vision and Light: Overview of Light (visible Light) with its perceptive parameters, such as Focus selection, Adaptation, Accommodation etc, and its effective components.



Mr. Kaustabh Nandurbarkar

Design objective: Understanding Light with its applications, thereby identifying needs like activity, biological and human factors etc. and drawing up the objectives e.g. environmental,

efficiency, etc.

Design Aspects: Understanding the sources of light, distribution systems and application methods, thereby giving an insight into implementation of qualitative lighting with analysis and inferences from some illustrated executions.

New concepts: Review of new subjects, trends, concepts with illustration. (day light luminaires, Circadian rhythm, static and dynamic lighting etc.)

The Presentation concluded with a four point solution matrix, as follows:

- a) Identify priorities: Activity
- b) Recognise: Environmental objectives
- c) Understand: Biological factors
- d) Assign Correctly : Lamp and luminaires

Breakfast with Light 12

May 26, 2013, Mumbai

In his lecture on Understanding Light and Vastushastra Dr. Raviraj Ahirrao brought out the use of ancient Indian



Dr. Raviraj Ahirrao

wisdom and practice of Vastu which if applied in a building and residence layout, can promote a better quality of life. He highlighted the importance of entry of sunlight into the house with its germicidal and health benefits and thus the need for appropriate layout design and construction. Use of colours and their effect on our well-being were also amply illustrated.

Breakfast with Light 13

June 30, 2013, Mumbai

The 13th lecture in the MSC Breakfast with Light series featured Mr. Abhijit Salunke. He titled his presentation Light Scene Interactive - How Light Drives Our Emotions - A Case Study of Project Installations.

Light Scene Interactive is a concept where different scenes are created through light in a space which is related to the activity happening and the mood or atmosphere required. This scene change using appropriate lighting layout and controls creates an interaction with space and the occupants thus getting different emotional response from them for each



Mr. Abhijit Salunke

of the scenes created. A case study of a completed project was presented wherein the gradual and smooth change in lighting scenes in various parts of a room created different spaces and moods for business, relaxation, meeting and entertainment. It successfully highlighted, that the most important aspect of 'Light Scene Interactive' is the 'Scene'.

MP STATE CENTRE

Lecture on Induction Lamps April 28, 2013, Indore

The M P State Centre organised its 42nd monthly lecture at the Hotel Country Inn in Indore. The speaker, Mr. Vinit Singh gave a presentation on Energy Conservation through Magnetic Induction Lamps for Industrial and Public Utility Applications.



Chairman, MP State Centre, Mr. Vinay Babar

The Guest of Honour was Dr. Sumant Katiyal, Director, College Development Council, DAVV Indore and Senior Professor, School of Electronics.

43rd Monthly Lecture May 26, 2013, Indore



Mr. Mahesh Agrawal

The speaker for the month of May was Mr. Mahesh Aggarwal, Chief Executive, Technocom Marketing. His lecture was titled Energy - The Life Line - Challenges and Opportunities.

The Guest of Honour was Dr. Kamal Bharani, Principal, Acropolis Institute of Technology.

Lecture on Solar and Lighting Technologies June 30, 2013, Indore

Dr. Vipul Singh, Asst. professor at IIT Indore covered the Recent Advances in Solar and Lighting Technologies.

The Guest of Honour on this occasion was Mr. Prakash Barjatia, member of the ISLE Governing Body and immediate Past Chairman of Mumbai State Centre.



Dr. Vipul Singh

Mr. Vinay Babar, Chairman of the M P State Centre gave a rundown on Photon 2013, the Lighting Exhibition scheduled from October 18-20, 2013 at the SGSITS College grounds in Indore. He also announced that the Bureau of Indian Standards in cooperation with the M P State Centre would hold an awareness seminar on the National Lighting Code in the month of December.

The programme was compered by Mr. Mahesh Agrawal and the vote of thanks proposed by Mr. Atul Kumar Pandey, Hon. Secretary MP State Centre.

CIE ACTIVITY

One Hundred Years of CIE

At the CIE Centenary Conference, Prof. Wout van Bommel, Past President CIE was asked to make a brief statement on behalf of CIE Past Presidents on the achievements of the organisation. He spoke on CIE's achievements in the "normal world". Given below is the text of his statement.

Madam President, Past-presidents, Ladies and Gentlemen of the Executive Committee, Dear Guests,

I am asked to outline what past-presidents see as the main achievements of CIE of the last 100 years. Well for me that is a little difficult because my acquaintance with CIE does go back only 45 years. But I will give it a try.

I decided to look around in the "normal" world around us, to find out if, and if so where, CIE made a difference for people in everyday life.

As an example, do we realize that when we go to a paint shop to buy a can of paint, that it is thanks to the achievements of CIE that each time again, we can buy exactly the same colour of paint? Our CIE colour triangle with everything behind it is, since more than 70 years, in the paint industry a very famous and indispensable tool.

The development of reliable colour television and computer screens would simply have been impossible without input from CIE, again on colour characterisation, and on how we see brightness. The same holds for copying machines, which we use all the time. The addition of a new CIE Division in 1999, specifically devoted to image technology has helped streamlining this process considerably.

Do we realize that, even with all high tech mechanics of today, travelling in a train, a plane or on a boat would be a very dangerous adventure, if CIE had not used that same CIE colour triangle, to standardise the signalization colours used in train, air and shipping traffic? And of course, the automotive industry could not have put a single car for sale, without CIE supporting standardisation on car head lamps, car rear lamps and car fog lamps.

Imagine that some 30 years ago when I travelled around the world and I took a lamp with me, each time when I arrived in a different part of the world, that same lamp had a different light output, simply because not all parts of the world used the same definition for the lumen. Today all over the world the same CIE definitions are used. Here it also helps that CIE signed some years ago a contract with the International Bureau for Weights and Standards here in Paris. If today you have problems with the light output of a lamp that is not because of unclear CIE definitions but sometimes because, surprisingly to me, not all LED manufacturers are completely honest in their claims. Fortunately however, this is improving now with the further professionalisation of the LED industry.

By the way, that same industry, urgently needed, some ten-fifteen years ago for LEDs, workable definitions for luminous intensity and guidelines how to measure it. Thanks to the enthusiasm of Division 2 experts, who realised that in this new semi-conductor industry fast work is essential, those definitions and guidelines are already quite some time ready for the LED industry to use. Of course, I realise that also in the future, LEDs will require a lot of work from CIE.

Do we realise that advice on how long and when we should or should not expose our body to UV radiation from the sun, or from sun tanning devices, is very much based on discussions within CIE by the various experts involved? Experts on the dangers of UV for skin cancer but also experts on the benefits of UV for lowering the risk of other types of cancer.

Today our lighting world knows about the important relation between light, dark and health. It was in 1995 that Prof. Brainard, a medical scientist working also for NASA, introduced for CIE the subject of non-visual biological effects of light. I remember that we all were fascinated. Today it is a common subject in both CIE Division 6 "Photobiology and Photochemistry" and in the Application Division 3 "Interior Lighting". We see already radically changed lighting installations for offices, industries and schools on the basis of knowledge spread by CIE. I hope, we all realise, that this will change, for the positive, the well-being and productivity of office and industrial workers and improve the concentration and, when needed the relaxation, of school children. In care institutions, both patients and staff, benefit from putting this new knowledge into practice.

I think, all those present here, realise that electrical lighting uses some 20 per cent of all electricity produced in the world. CIE has, on many occasions and in many publications, pressed for sustainable lighting, especially in terms of efficacy, lifetime and safety of products, and in terms of lighting installations that are adaptable in lighting level.

Also the subject of avoiding light pollution has already since long been a subject in CIE, the first publication on the subject dates from as early as 1980. This CIE work item should help all of us not being disturbed by exterior electric lighting installations.

Finally, Madame Chairman, Ladies and Gentlemen, do we realise, that so many of our standards, recommendations and guidelines are based on research carried out with relatively young persons? I believe, now that we have become 100 years old, it is time to devote a little bit more attention to the fact that the older eye does require different lighting than the younger eye does. This is more important given the fact that the average human being becomes older and, that in most parts of the world, we have to work longer, until at least 65 or 70 and, many people in this room, probably until 75.

When I got acquainted with CIE, CIE was known as a "learned" society. Quite some scientists are still very active in CIE and that is very important indeed for the future of CIE. But, I think it is also good that CIE changed from a predominantly, science organisation to a more practical oriented and also to a more commercial organisation.

Continued on page 19

**For a glow like
the Sun,**

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E 27, E 40
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Ended
Lamps**

Wattages: 70, 150, 250



Tubular Lamps

E 27
E 40
Wattages:
70, 100, 150,
200, 250, 320,
400, 600, 1000



**Colour Lamps
(Tubular)**

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Green, Blue,
Pink and Magenta
150W - Blue & Green



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MAKHIJA 5378

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GERD PFARRÉ, FIALD
 KATJA MOEBS
 KATRIN ROHR
 CHRISTOPH MATTHIAS
 PFARRÉ LIGHTING DESIGN
 ERWIN DÖRING
 D-LIGHT VISION

PHOTOGRAPHY

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HAFENCITY-UNIVERSITY SUBWAY STATION HAMBURG, GERMANY

Suspended high above the Hafencity-University U4 subway platform are 12 "shipping containers" designed to the exact dimensions of those used in the Hafencity district's former life as a global shipping center. Instead of tangible goods, these containers designed by Pfarré Lighting Design contain light.

"There are so many elements I love about this project," one judge said of the project. "Art as functional light, elegant programming, seamless integration and expression of transportation."

Hafencity Hamburg is a large-scale rebuilding project that aims to convert the city's free port district into offices, hotels, shops, official buildings and residential space. With decreased economic importance of free ports in the European Union, the Hamburg free port was reduced in size in 2003, allowing 2.2km² of space to be rezoned as a new section of the city center in 2007.

The design of Hamburg's Hafencity-University station was inspired by the iridescent colors sunlight creates on brick façades in the Hafencity development project over the course of a day, as well as the steel ship hulls filled with ocean freight containers you could find in the port in its heyday. Each "container" developed for the Hafencity-University station weighs 6 tons and incorporates 260 RGB-LEDs.

Preset scenes can be used for day and night, when a train is approaching, or simply to create a visual sensation while waiting. The scenes can be static or dynamic, depending on the needs of the moment.

"This project teaches a lesson in how to use light to make a space functional, safe, fun and just plain awesome," another judge commented on the project.

Clad with 6500m² of treated steel sheets, the station's walls and ceiling become enormous reflective surfaces on which the light from the shipping containers splay. The smooth color reflections create an effective and imposing contrast to the evenly distributed warm white T5 light integrated into each container's bottom portion to illuminate the 200m platform.

"A light sculpture is [...] so unexpected at a railway station," another judge commented. "It is overwhelming and magical."

After five years of construction, the U4 and its Hafencity-University stop began servicing the area in November 2012. The addition to Hamburg's public transportation system was an immediate benefit to the 9,000 employees and 2,000 residents of Hafencity. When the project is completed, up to 35,000 people are expected to use the line every day.



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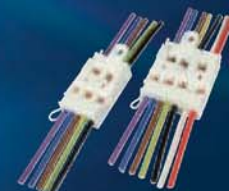
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OMTA



ZRM terminals



LIGHTING DESIGN

LIGHTING DESIGN
PAUL BEALE, IALD
JESS PERRY
ELECTROLIGHT

PHOTOGRAPHY

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CROWN TOWERS EASTERN ENTRY MELBOURNE, AUSTRALIA

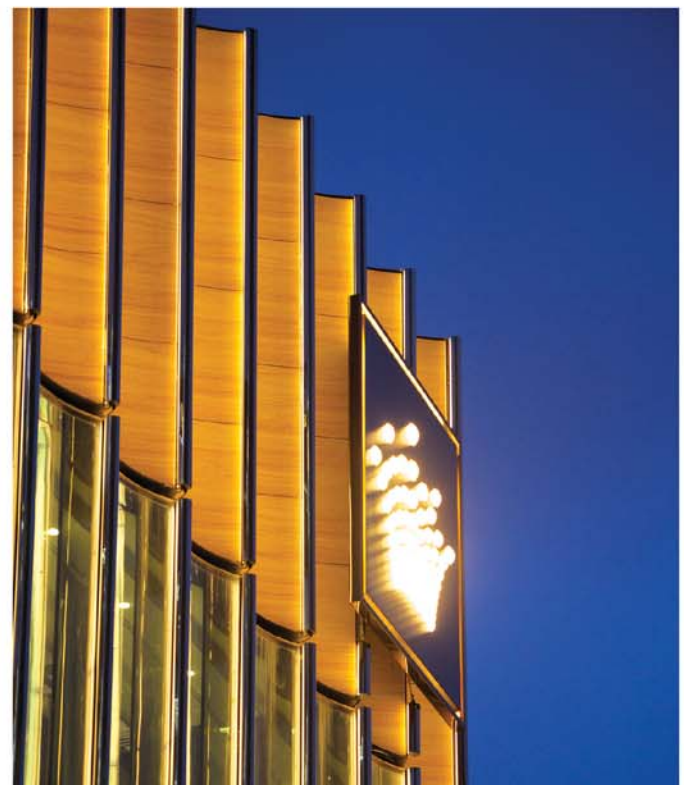
Crown Melbourne is an entertainment complex comprising a casino, luxury hotel, five-star restaurants, bars and retail offerings. The eastern end of this complex was extended, incorporating a new façade. The challenge was to light the façade while accentuating the richness of the faceted glass and sumptuous sandstone elements.

"The lighting of the façade has created a cross between a sparkling jewel and bubbles in champagne," one judge commented of the project.

The design concept was that of a luxury perfume bottle with precious contents. The interesting effect realized over the entire sandstone and glass façade was achieved through concealing cold cathode light in the façade nosing. Light is reflected in each of the corrugations of the individual glass panels. The thickness of these panels and the lighting treatment add depth, sparkle and warmth, enticing patrons with the sense of luxury and sophistication.

"Full integration of lighting with the architecture results in not only a beautiful façade design but also [acts as] branding and signage," another judge said. "If only every project could have this level of lighting integration."

The nosing system is designed to avoid any direct view of the light source, yet delivers light to the adjacent glass and sandstone. The effect is of a glowing façade, but it is difficult to tell where the light is coming from. Turned-back electrodes were specified for the cold cathode lighting to give a completely unbroken line of light the exact length of the façade, from top to bottom. Low-power cold cathode (20mA) was chosen over LEDs in favor of its omnidirectional light distribution, color appearance, lamp life and cost.



LIGHTING DESIGN
 TAPIO ROSENIUS, IALD
 OSCAR MARTIN
 RODOLFO LOZANO
 VICTOR SORIA
 GORKA CORTAZAR
 REINALDO ALCALA
 RODRIGO ARCAJA
 LIGHTING DESIGN COLLECTIVE

PHOTOGRAPHY
 © HANNU ISO-OJA
 © TUOMAS UUSHEIMO
 © TAPIO ROSENIUS, IALD



SILO 468 HELSINKI, FINLAND

With light as the sole transformative element, Silo 468 reinvents a functionally abandoned oil silo sitting near the sea, facing central Helsinki, into light art and a public space. Well-known to the inhabitants of Helsinki, the area's prevailing winds served as the muse for the design team from Lighting Design Collective. Using natural light, wind and the movement of light on water as visual inspiration, and perforating the walls of the silo with 2012 holes in honor of the World Design Capital year, this project embodies the aesthetic and technical excellence indicative of IALD International Lighting Design Award-honored projects.

"The creativity in using both electric lighting and daylight to create a living, breathing space shows how light can transform an abandoned industrial element into a well-used public attraction," one judge commented.

Silo 468's 2012 circular cut-outs are fitted with 1,280 2700K LED domes. The lighting design team developed bespoke software using swarm intelligence and nature simulating algorithms that refresh responding to parameters, such as wind speed, direction, temperature, clear night and snow. The patterns are fluid, natural in feel and never repeat. Patterns start off moving slowly but speed up in relation to the wind speed, creating a constantly changing mural of light.

Exterior floodlights with 2700K white and red LEDs are used to illuminate the form of the silo during sunset. After sunset the floodlights dim, allowing the naturally moving pattern to become the primary focus. When viewed from central Helsinki, 3 kilometres away, the pattern appears to be floating in mid-air. At midnight, the exterior turns deep red for one hour, referencing the former use of the silo as a container of energy. At 2:30 A.M, the lights turn off.

The inside surfaces of Silo 468 are painted a deep red. Fitted behind the cut-outs are 450 steel mirrors moved by the strong area winds. With sunlight, the silo appears to glimmer like the surface of water. The warm white LED grid reflects light indirectly via the red walls into the space, and the moving patterns read as halos racing across the walls.

"The magical experience in the interior is breath-taking and so unexpected," one judge praised of the interior space.

Silo 468 has transformed itself into a civic space for the citizens of Helsinki. Light intervention has created a new space for the people of the area.





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Rensselaer

It has been essential that CIE did build up strong relationships with many different stakeholder groups, some of whose representatives will talk to us next. Many of the positive achievements of CIE have only been possible thanks to CIE's collaboration with so many other institutions and groups, from the science world, the standardisation world, the lighting application world, lighting designers and the lighting industry.

It is my pleasure, also in the name of my colleague past-presidents, to congratulate CIE with its 100 year's anniversary. We trust that CIE will remain indispensable, will remain very active and will meet many challenges for future achievements in lighting that will continue to be important for so many people in everyday life.

Thank you for your attention.

Wout van Bommel
Past President CIE

CIE PUBLICATIONS

Characterization of the Performance of Illuminance Meters and Luminance Meters Standard CIE S 023/E:2013

This CIE International Standard defines quality indices characterizing the performance of illuminance and luminance meters in a general lighting measurement situation, as well as measurement procedures for the individual indices and standard calibration conditions.

Measurements of illuminance or luminance and their accuracy are influenced by various parameters, such as operational conditions, properties of light sources, as well as characteristics of the applied photometers. The characteristics of these photometers alone do not allow the determination of the measurement uncertainty for a specific measurement task. Nevertheless, it is generally true that instruments with "better" characteristics in most cases produce smaller uncertainties than instruments with "worse" properties. This Standard has been written to:

- give clear and unambiguous definitions for the individual quality indices;
- define measurement procedures and methods for numerical evaluation of these quality indices;
- define calibration conditions for illuminance meters and luminance meters.

Where different, the definitions of the quality indices and the associated measurement procedures and methods for numerical evaluation given in this Standard supersede those given in CIE Publication 53-1982. CIE publication 69-1987 shall be superseded by this Standard.

This CIE International Standard has been approved by the CIE National Committees. It is readily available via the CIE Webshop.

Methods for Re-defining CIE D Illuminants CIE 204:2013

This Technical Report gives an overview of the construction of the tables describing CIE D illuminants, and proposes two methods to smooth the daylight illuminant spectral power distributions. The first method keeps the values originally determined at the integer 10 nm intervals unchanged and interpolates between these fixed points to get smooth (twice differentiable) curves (minimal smoothing method). A second alternative method smoothes more strongly, cutting fine structure maxima and minima of the spectrum (highly smoothing method).

Examples show the consequences of both methods, pointing out that smoothing has little influence on colorimetric accuracy.

The Technical Committee recommends testing the provided tables based on the two smoothing algorithms in practice and to urge users to test data of Table 4 which are based on the highly smoothing method, and ask instrument constructors to test the method for building D illuminant simulators with the eventual outcome of defining a CIE D50 and D65 standard source.

The publication provides a link to two Excel files: one for calculation of the SPD of a daylight illuminant for the different interpolation methods described in this report after input of a required CCT and another one providing the tables of the report.

The publication is written in English, with a short summary in French and German. It consists of 75 pages with 13 figures and 5 tables and is readily available via the CIE Webshop.

Proceedings of the CIE Centenary Conference **"Towards a New Century of Light"** CIE x038:2013 (including Addendum 1)

In April 2013 CIE celebrated its 100th birthday in the course of its Midterm Meeting in Paris, France. The meeting was accompanied by a 2-days conference on the subject "Towards a New Century of Light". In 2 keynote speeches, 60 oral presentations and 134 posters experts from all over the world presented latest research results and survey lectures on various subjects related to light and lighting, e.g. "History of Lighting and Art", "Hot Topics in Outdoor Lighting", "Colour Quality Assessment",

"Health and Wellbeing", "Workplace Lighting Concepts", "Hot Topics in Interior Lighting", "Advanced Correction Methods for Spectroradiometry", "Lighting the City - Applications and Economics", "Integrating Daylight and Electric Lighting", "LED Photometry and Performance of Photometers", "Lighting the City - Luminaires and Design", "Concepts in Lighting Quality", "Brightness and Colour, Individual or Shared Percepts", "Lighting the City - Spaces", "Wellbeing, Glare and Comfort".

The Proceedings of this Conference consist of 1288 pages including 176 papers of oral and poster presentations with some 1200 figures and some 300 tables.

It is readily available via the CIE Webshop.

NEWS ABOUT MEMBERS

Biswajit Ghosh Nominated for Bequerel Prize

Dr. Biswajit Ghosh, Director, School of Energy Studies, Jadavpur University, ISLE Fellow and former Governing Body member has been nominated for the 2013 Edmond Bequerel Prize. He was nominated by the Chairman of the World Council for Renewable Energy (WCRE), Dr. Wolfgang Palz for "his outstanding contributions in developing photovoltaic cells in general and thin film photovoltaic cells in particular".. The nomination also mentions his role in raising the human development index of a remote island community in the Bay of Bengal by taking PV power there in 1984.



Dr. Ghosh is presently involved in solar power projects in Kyrgyzstan, Sierra Leone and Gujarat.

M. S. N. Swamy Conferred Aryabhata International Award



Dr. Mahesh Joshi ADG Door Darshan, Justice S R Bhanumath Former Chief Justice of Kerala High Court, Mr. Dwarakish Popular Actor, Producer & Director, Dr. H L N Rao President Aryabhata felicitating Mr. Swamy

On April 28, 2013 Mr. M.S.N. Swamy, Chairman, Founder Member and moving spirit of Karnataka State Centre was conferred the Aryabhata International Award "in recognition of his work in the field of lighting, for spreading the knowledge of lighting and empowering people on energy saving by proper selection of lighting equipment protecting the environment by preventing improper disposal of discharge lamps".

Mr. Swamy is the author of "Lighting - What Everyone Should Know". This publication is the result of the author's four decades spent in the field of lighting in varying capacities.

ISA

Call for Applications on "Global SSL Showcase Top 100"

Global SSL Showcase Top100 (TOP100) and Global SSL Events of the Year (EOY) are regular events under ISA's Working Group 2: Global Showcases and Working Group 5: Public relations & Membership, which aims to identify the premium SSL projects and events worldwide and introduce them to the industry and the public. These two events have been successfully launched in 2012 and many extraordinary and influential SSL showcases and events have been selected as the winners. In order to continue the meaningful work and provide valuable service to our members and the SSL industry, TOP100 and EOY are now open for application.

In case you wish to enter any interesting SSL project in the ISA Showcase, please IMMEDIATELY contact the ISLE Secretariat in New Delhi at isledel@vsnl.com

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Solar Energy for India

SYAMAL GUPTA

KEY NOTE ADDRESS
"Solar Power : Tomorrow's Major Source of Electricity"
04 May 2013

Prepared by
Dr. Paresh V. Paluskar
Tata Consulting Engineers Limited



1

Outline



India's need for Sustainable Power Source - Renewables

1. Climate change
2. Electricity deficit



The vision, the beginning

Potential of renewables, solar

Tata BP Solar beginning

Tata BP Solar journey



Present & future of Indian solar PV

Policies & initiatives

Installed capacity and future



Summary



2

Climate change – target limit to 2°C rise

BBC: May 2009

"About three-quarters of the world's fossil fuel reserves must be left unused if society is to avoid dangerous climate change"

Reuters: May 2009

"World can burn only 25 % of oil & coal safely"

Independent: May 2009

"World will have exceeded 2050 safe carbon emissions limit by 2020"

New Scientist: May 2009

"Humanity's carbon budget set at one trillion tonnes"

"\$38 trillion of (global) investment is required to meet projected energy demand through to 2035. Of this, the IEA projects that almost two-thirds of incremental energy demand in 2010-2035 will be met by natural gas and renewables."

"Global fossil-fuel subsidies totaled \$ 523 Bn in 2011 compared to \$ 88 Bn to renewables"

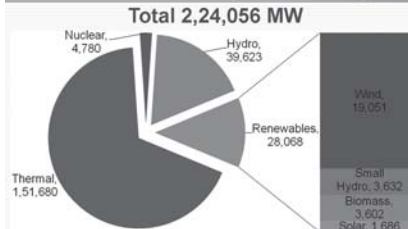
"Four-fifths of the total energy-related CO₂ emissions permissible by 2035 in the 450 ppm GHG Scenario are already "locked-in" by our existing capital stock (power plants, buildings, factories, etc)"

"**Delaying action is a false economy:** for every \$ 1 of investment avoided in the power sector before 2020 an additional \$ 4.3 would need to be spent after 2020 to compensate for the increased emissions."

Source: IEA - WEO 2011

3

Total installed power capacity in India



- 58 % of the total installed capacity is based on coal based generation †
- Electricity Deficit: 9.3 % (14,856 MW) in 2012-13 †
- Current State's power utility losses ~ INR 2 lakh cr (\$36 Bn); AT&C losses >25%
- Current Five Year Plan (2012-17): 88,425 MW additional ‡
- Investment required (2012-17): INR 18.2 lakh crore (US \$ 337 Bn) ‡

- India to surpass China as biggest coal importer soon after 2020*
- Coal demand by 2017: 842 MMt; Domestic production: 604 MMt ‡
- Indian power utilities have stalled plans to invest INR 1.87 lakh cr (\$ 34 Bn) to build 42 GW of capacity as coal output fails to meet demand"

Source: † CEA - All India Electricity Generating Capacity IEA WEO 2011
‡ GOI - 13th Finance Commission Report
* Bloomberg - 28th Aug 2012
‡ Planning commission - Power & Energy 2012-17

4

Potential of renewables in India

Renewable Source	Potential (GW)	PLF (%)	Generation (MU/year)	Electricity supply to population (Crore)
Biomass + Cogeneration	23 ¹	60%	≈ 120,000	≈ 13.7
Wind (5 % of US LBNL's estimate 2006 GW)	100.6 ²	25%	≈ 219,000	≈ 25
Large hydro	148.7 ³	60%	≈ 781,000	≈ 88.9
Small hydro	20 ⁴	45%	≈ 78,000	≈ 9
Solar PV	100 ⁵	20%	≈ 175,000	≈ 19.9
Total	≈ 392		≈ 1,376,000⁶	≈ 156.5⁷
India capacity today	≈ 223		≈ 930,000	deficit of 92,000 MU

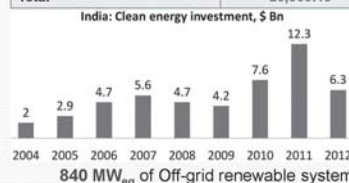


Source: ¹ National Hydro Power Corp. (<http://www.nhpcindia.com/potential.htm>)
² Lawrence Berkeley National Lab: India's wind potential estimates from 2006 GW to 3121 GW
³ National Hydro Power Corp.
⁴ MNRE 26-Apr-2013 (L...)
⁵ 68 GW by 2022 estimated by KPMG "The rising sun 2011". Technical potential more than 100 GW
⁶ Authors' estimate based on 875 kWh/capita consumption of India as per CEA Monthly review of power sector & Load Generation base report - Mar 2013

5

India's renewable achievements

Grid Interactive Sources / Systems	Cumulative till 31-03-2013 (MW)
Wind Power	19,051.45
Small Hydro Power (≤ 25 MW)	3,632.25
Cogeneration-bagasse	2,337.43
Solar Power	1,686.44
Biomass Power (Agro residues)	1,264.80
Waste to Energy	96.08
Total	28,068.45



840 MW_{eq} of Off-grid renewable systems have been installed to date

Source: MNRE <http://www.mnre.gov.in/achievements.htm> Accessed 20th May 2013

6

Solar – global potential



Present Global consumption: 20×10^{12} Watts
 Global consumption in 2050: $25-35 \times 10^{12}$ Watts

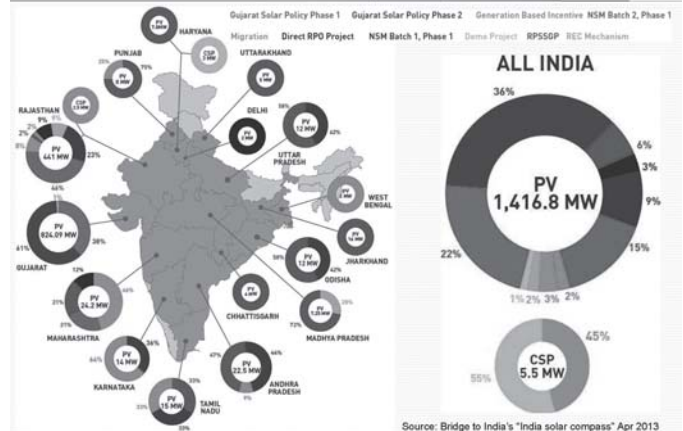
Solar energy can provide all the energy we need

Covering 0.16 % (0.23 Mn sq km) of land on Earth with 10 % efficient solar systems would provide 20 TW of power. Present need is 20 TW

- Global installed capacity of 100 GW at the end of 2012.
- Annual growth of > 55 % over 2005-2011.
- Considering an estimated demand of 25 – 30 TW/year in 2050,
- Solar power is the only renewable that can actually meet such a challenge alone.

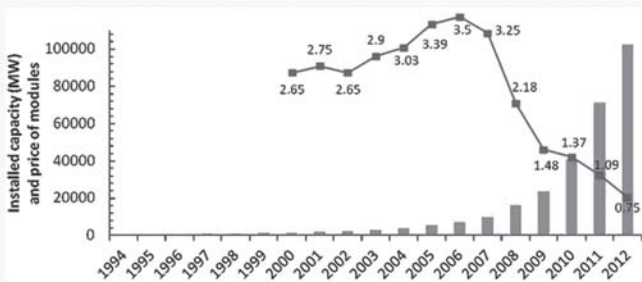
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India's solar installed capacity



8

Solar PV costs



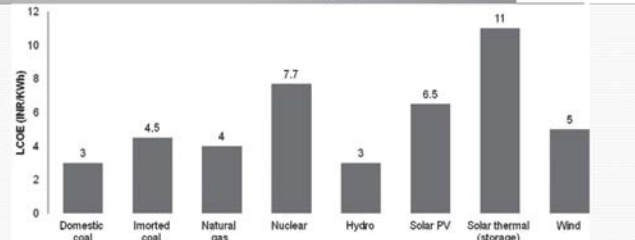
From 2004 to Q3 2008, price of PV modules remained approximately flat at \$3.00-\$4.00/W.

PV module prices have fallen 80 % since 2008; 20 % in 2012 alone.

Source: IRENA – Renewable energy cost analysis - Solar PV 2012
 BNEF - Re-considering the Economics of Photovoltaic Power 2012

9

Levelized cost of electricity (LCOE) in India



On grid parity, solar power can potentially meet as much as 7 % of India's power requirement and mitigate 30 % of India's imports of coal and 2.6 % of India's annual CO₂ emissions.

Forex savings due to coal mitigation can be as high as **US \$ 8 Bn p.a.** by 2022. † Diesel savings of **US \$ 5-6 Bn p.a.** can be achieved in solar based telecom towers. ‡

LCOE calculations includes initial capital, discount rate, as well as the costs of O&M, and fuel. Source: KPMG – The Rising Sun 2012 † Hindu Business Line (article link) 6th Mar-13 ‡ Author's estimates

10

Government support – a right framework

The right solar framework

Solar Renewable Purchase Obligations (RPOs) are the minimum amount of solar energy that "obligated entities" – distribution licensees, open access and captive consumers – have to deliver or consume as a percentage of their total available electricity.

11

National solar mission & state policies

Application segment	Target for Phase I (2010-13)	Target for Phase 2 (2013-17)	Target for Phase 3 (2017-22)
Off grid solar	0.2 GW	1 GW	2 GW
Utility power, roof top	1.3 GW	4-10 GW	20 GW

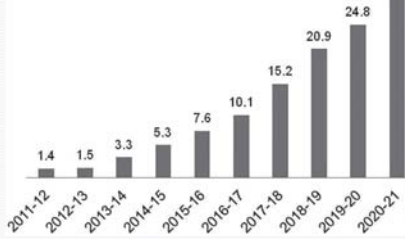
State	Total (MW)	Period
Gujarat	3,000	2015
Rajasthan	900	2011-17
Karnataka	200	2015-16
Maharashtra	500	2014-15
Orissa	500	2020
MP	500	
UP	1,000	2017
Tamil Nadu	3,000	2015
AP	1,000	2017
Punjab	1,000	2022
Kerala	1,500	2030
Bihar	200	2016
Jharkhand	300	
Chhattisgarh	500	2017
TOTAL	13,600	

Source: † Bloomberg July 2012 ‡ IEA - National survey report of PV Power Applications in Japan 2009

12

Solar renewable purchase obligations

Solar capacity requirement for RPO compliance (GW); Total of 34 GW expected by 2022



The key policy issue to be addressed is enforcement of the RPO's by Govt.

Four options for "obligated entities" to fulfill RPO quotas:

1. generate their own solar power
2. purchase solar power from market
3. buy solar Renewable Energy Certificates (RECs) to meet quota
4. Non-compliance

Source: MNRE Expected Solar RPO requirement and compliance for 2013-14
Bridge to India's "The REC mechanism" 2012

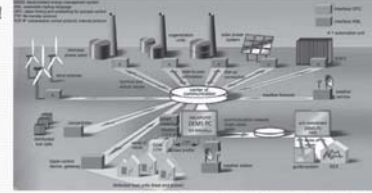
13

Room for improvement

Distributed capacity investment by country, 2011, \$Bn

Country	2011 (\$Bn)	% growth on 2010
China	0.7	14%
Greece	0.8	405%
Spain	1.3	44%
France	2.7	99%
United Kingdom	3.8	1621%
Australia	3.8	105%
United States	4.2	5%
Japan	8.1	25%
Germany	20.0	-20%
Italy	24.1	76%

India missing!



Source: UNEP / Bloomberg: Global Trends in Sustainable Energy Investment 2012

14

Solar Power = Social Improvement



More economical than conventional where village located more than 10 km from the main electricity grid line.



15

Creation of Rural Jobs - Inclusive growth



MNRE estimates that over 50,000 direct jobs have been created in the last three years in the New & Renewable Energy Sector.

An employment for nearly 40 people is generated during erection & commissioning of a 1-2 MW PV Project, increasing by 15 for every additional 1 MW capacity.



Source: MNRE: Over 50,000 direct jobs created in New & Renewable Sector Mar-2013

16

Solar Power = Social Empowerment

Solar lights and power have transformed lives of villagers:

- Working hours extend into night - Family's income level goes up
- Kerosene lamp and its accompanying fumes dispensed with - Family's health improves
- Television set - opens up a new world of information, entertainment and education
- Women can finish household chores
- Children can study at night



17

A vision of the future



Renewable energy has the potential to supply **all** our current energy demands, and at the same time allow us to address various issues:

- Climate change
- Energy security
- Public insecurity about nuclear power
- Ill-effects of air pollution on health

Source: Image from Nature Magazine 2008
Contact: p.v.paluskar@toe.co.in

18

MEMBERSHIP APPLICATIONS APPROVED BY GOVERNING BODY

New Members Admitted on 27th May 2013

I.0170	Lighting Science India Pvt. Ltd. 607, DLF Tower A Jasola New Delhi 110 064	Institutional	Delhi	F.0810(L)	Kalpana Babar Technocraft 23 Kalpana Lok Indore 452 018	Fellow (Life)	M P
IM.0170	Arun Narayan Lighting Science India Pvt. Ltd. 607, DLF Tower A Jasola, New Delhi 110 064	Institutional Representative	Delhi	F.0811(L)	Md. Mohiuddin University Polytechnic Jamia Millia Islamia New Delhi 110 025	Fellow (Life)	Delhi
I.0171	Homdec Lighting (India) Pvt. Ltd 56/34, Site-IV Industrial Area Sahibabad Ghaziabad 201 010	Institutional	Delhi	F.0812(L)	Sovon Majumder Flat No.6, EE-153, Sec-II Salt Lake Kolkata 700 091	Fellow (Life)	Calcutta
IM.0171	Anuj Arora Homdec Lighting (India) Pvt. Ltd 56/34, Site-IV Industrial Area Sahibabad Ghaziabad 201 010	Institutional Representative	Delhi	M.1815(L)	Dipten Nagchaudhury Technolite Solar India Pvt. Ltd. 167 B, S. P. Mukherjee Road Kolkata 700 026	Member (Life)	Calcutta
F.0800(L)	Manjulika Roy B-1/3/101 Peerless Housing Sonarpur Kolkata 700 150	Fellow (Life)	Calcutta	M.1816(L)	Rajat Verma E-305, Orange County Near Triveni Colony Adarsh Gram Indore	Member (Life)	M P
F.0801(L)	Sansar Pattanayak Gr. No. 3, Type V CPDO Colony Nayapalli Bhubaneswar 751 012	Fellow (Life)	Calcutta	M.1817(L)	Akhilesh Chouhan 200-A, Veena Nagar Sukhlia Indore 452 010	Member (Life)	M P
F.0802(L)	Swami Prasad Sinha Metro Homes Apartment Flat No. 204, Damana Square C S Pur Bhubaneswar 751 016	Fellow (Life)	Calcutta	M.1818(L)	Suresh Thawani S.S. & Associates H/2, IInd Floor Kamdheni Complex 196, Zone -I, M.P Nagar Bhopal 462 011	Member (Life)	M P
F.0803(L)	Srikanta Mohapatra Qrs. No. IVR-196, Unit-6, Bhubabneswar 751 001	Fellow (Life)	Calcutta	M.1819(L)	Ajay Gupta 57M Veena Nagar Sukhaliya Indore 452 010	Member (Life)	M P
F.0804(L)	Pravat Kumar Parhi Professor & HOD Civil Engg. Deptt. College of Engineering & Technology Ghatikia Bhubaneswar 751 003	Fellow (Life)	Calcutta	M.1822(L)	Harsh Ramgir 39-A, Sector -A Sainath Colony Indore 452 001	Member (Life)	M P
F.0805(L)	Ranjan Kumar Swain A/3, IGIT Campus IGIT Sarang Dhenkanal 759 146 Odisha	Fellow (Life)	Calcutta	M.1823(L)	Mandeep Singh Chhabra 57-A, Nanak Nagar Pipliya Rao Indore 452 001	Member (Life)	M P
F.0806(L)	Ashish Raje 579/1/3, M.G. Road Behind Sunrise Tower Indore	Fellow (Life)	M P	M.1824(L)	Akshat Goyal Valiant Electricals Pvt. Ltd. 72N Polo Ground Industrial Estate Indore 452 015	Member (Life)	M P
F.0807(L)	Rajiv Jain G-34, M.I.G. Colony RSS Nagar Indore 452 001	Fellow (Life)	M P	M.1825(L)	Chetna Bannote House No. 71, Ahinsa Vihar Colony Ayodhya Bypass Road Bhopal 462 041	Member (Life)	M P
F.0808(L)	Unmesh Gajanand Trivedi Shrinath Products 1, Subhash Marg Near Chiman Bagh Chouraha Indore 452 007	Fellow (Life)	M P	M.1826(L)	Shalabh Agarwal KI-144, Kavi Nagar Ghaziabad 201 002	Member (Life)	Delhi
F.0809(L)	Shailendra Kumar Vyas 404, Samarsharan Apartment 16/1, South Tukoganj Indore 452 001	Fellow (Life)	M P	M.1826(L)	Amit Gupta Mangle Electrical & Electronics 326 Clerk Colony IIT Main Road Indore 452 011	Member (Life)	Delhi
				M.1828(L)	Rajesh Taose R K Trading Company 33 Barwani Plaza, Ist Floor, 12 Old Palasia Indore 452 018	Member (Life)	M P
				M.1829(L)	Santosh Taose R K Trading Company 33 Barwani Plaza, Ist Floor 12 Old Palasia Indore 452 018	Member (Life)	M P

M.1830(L)	Alexander Paul 145/76, Pillayar Koil Street S4, Mahalakshmi Enclave Jafferkhanpet Chennai 600 083	Member (Life)	Chennai	A.1182(L)	Mousumi Mishra B/181 Nalco Nagar Angul 759 145 Orissa	Associate (Life)	Calcutta
M.1831(L)	Jaydeep Mukherjee 4/2K/5, Ho Chi Min Sarani Shakuntala Park Behala Kolkata 700 061	Member (Life)	Calcutta	A.1183(L)	Lipsa Nayak School of Electrical Engineering KIIT University Bhubaneswar 751 024	Associate (Life)	Calcutta
M.1832	B.N. Moolchandani 4-BHA-1, Jawahar Nagar Jaipur 302 004	Member	Rajasthan	A.1184(L)	Sabyasachi Pattanaik Flat No. 101, Metro Bellview Satichoura Chhack P.O. Chandini Chowk Cuttack 753 002	Associate (Life)	Calcutta
A.1169(L)	Ravi Kumar Gudware N V Bhole & Associates 238/ 2 Lokmanya Nagar Indore 452 009	Associate (Life)	M P	A.1185(L)	Ritesh Dash MIG 2, 13/8 BDA Colony Chandrasekharpur Phase I Bhubaneswar 751 016	Associate (Life)	Calcutta
A.1170(L)	Subhanarayan Sahoo M-159, Baramunda Housing Board Colony Bhubaneswar 751 003	Associate (Life)	Calcutta	A.1186(L)	Satish Kr. Jangid Near Banki Mata Teacher Colony, Rajbagh Sawai Madhopur 322 021	Associate (Life)	Rajasthan
A.1171(L)	Banishree Misra Asst. Prof. G (11) School of Electrical Engineering KIIT University Bhubaneswar 751 024	Associate (Life)	Calcutta	A.1187(L)	Vaibhav Jain Poornima College of Engineering ISI-6 RIICO Institutional Area Sitapura Jaipur 302 022	Associate (Life)	Rajasthan
A.1172(L)	Lipika Nanda HIG 2/1, O.S.B. Colony Chandrasekharpur Phase-1, Bhubaneswar 751 016	Associate (Life)	Calcutta	A.1188	Mayank Jauhari 50 Samrat Enclave Pitampura New Delhi 110 034	Associate	Delhi
A.1173(L)	Lopamudra Mitra Silicon Institute of Technology Silicon Hills Patia Bhubaneswar 751 024	Associate (Life)	Calcutta	A.1189	Himanshi Jauhari 50 Samrat Enclave Pitampura New Delhi 110 034	Associate	Delhi
A.1174(L)	Samar Roy 125 Tripura Roy Lane Salkia Howrah 711 106	Associate (Life)	Calcutta	A.1190	Parag Majmudar Ritman Infra Ltd Ritman House 14 Syed Ali Amir Ali Avenue Kolkata 700 017	Associate	Delhi
A.1175(L)	Vinay Toshniwal Ladhuram Toshniwal & Sons Plot No.576/15 (2nd Floor) Someigadia, Mancheswar Bhubaneswar 751 010	Associate (Life)	Calcutta	S.1480	Mousumi Banerjee	Student	Calcutta
A.1176(L)	Supriya Pattanayak Plot No.GA-40, Sailashree Vihar Chandrasekharpur Bhubaneswar 751 021	Associate (Life)	Calcutta	S.1481	Indrani Saha	Student	Calcutta
A.1177(L)	Shubhra H. No. IR, Shivpur Shahbazganj, P.O Jungle Salikram Gorakhpur U.P. 273014	Associate (Life)	Calcutta	S.1482	Surojit Ghosh	Student	Calcutta
A.1178(L)	Brijesh Jaiswal Ritman Infra Ltd. 14, Syed Amir Ali Avenue Kolkata 700 078	Associate (Life)	Calcutta	S.1483	Sougata Das	Student	Calcutta
A.1179(L)	Sangeeta Debbarmann School of Electrical Engineering KIIT University Bhubaneswar 751 024	Associate (Life)	Calcutta	S.1484	Amrita Bhattacharya	Student	Calcutta
A.1180(L)	Debanjan Roy School of Electrical Engineering KIIT University Bhubaneswar 751 024	Associate (Life)	Calcutta	S.1485	Anirban Ghosh	Student	Calcutta
A.1181(L)	Soumyadeep Ray School of Electrical Engineering KIIT University Bhubaneswar 751 024	Associate (Life)	Calcutta	S.1486	Prasun Sundar Dasgupta	Student	Calcutta
				S.1487	Rajib Malik	Student	Calcutta
				S.1488	Abhishek Yadav	Student	Calcutta
				Transfer of Grade			
				F.0813(L)	Anoop Mukund Kekre 143, Kalindi Kunj Pipalyahana Indore 452 001	Fellow (Life) from M.1556(L)	M P
				M.1820(L)	Khuman Singh Sisodia K.S. Enterprises G-5, Prime Trade Centre 14, Sikh Mohalla Indore 452 007	Member (Life) from A.1102(L)	M P
				M.1821(L)	Manoj Yadav K.S. Enterprises G-5, Prime Trade Centre 14, Sikh Mohalla Indore 452 007	Member (Life) from A.1099(L)	M P
				New Members Admitted on 10th July 2013			
				I.0172(L)	Gears Energy Solutions (P) Ltd H 724 Sitapura Industrial Area Jaipur 302 022	Institutional (Life)	Rajasthan

IM.0172	Raj Kumar Bhutra Gears Energy Solutions (P) Ltd H 724 Sitapura Industrial Area Jaipur 302 022	Institutional Representative	Rajasthan	M.1839(L)	Rajendra G. Kamble A-12 P.S. Tower Opp. Noble Hospital Hadapsar Pune 411 028	Member (Life)	Mumbai
I.0173	Sardar Patel College of Engineering Bhavan's campus Munshi Nagar Andheri(W) Mumbai 400 058	Institutional	Mumbai	M.1840	Chandra Bhanu Kumar Nichia Chemical (I) Pvt Ltd 203B & 204 DLF Galeria Mayur District Centre Mayur Vihar Phase I New Delhi 110 091	Member	Delhi
IM.0173	S.H. Abidi Sardar Patel College of Eng. Bhavan's campus Munshi Nagar Andheri (W) Mumbai 400 058	Institutional Representative	Mumbai	A.1191(L)	Dhanashree Arun Mali Saptshrungi Niwas Matoshree Park 1 Sant Tukaram Nagar Bhosari Pune 411 039	Associate (Life)	Mumbai
I.0174	Starlite Components Limited 64-B-1 MIDC Area Satpur Nashik 422 007	Institutional	Mumbai	A.1192(L)	Mehul Chhatbar Ground Floor, Arisa Mahal 8 Walkeshwar Road Mumbai 400 006	Associate (Life)	Mumbai
IM.0174	Arvind Subhashchandra Bharati Starlite Components Limited 64-B-1 MIDC Area Satpur Nashik 422 007	Institutional Representative	Mumbai	A.1193(L)	Yogesh Balkrishan Palekar Sr. No. 218/1 Matoshree Park 1 Sant Tukaram Nagar Bhosari Pune 411 039	Associate (Life)	Mumbai
F.0814(L)	Subodh Gopal Talwalkar Illumination Enterprise 3 Pushpagandha Appasaheb Marathe Marg Prabhadevi Mumbai 400 025	Fellow (Life)	Mumbai	A.1194	Prateek Singh Flat No. 9015, Sector B-9 LIG Flats Vasant Kunj New Delhi 110 070	Associate (Life)	Delhi
F.0816(L)	Ashok Kumar Tripathy Advisor (Research) Silicon Institute of Technology Pata Hills Bhubaneshwar 751 031	Fellow (Life)	Calcutta	Transfer of Grade			
M.1833(L)	Saurabh Agrawal Universal Solar Energy Solutions 101, 1st Floor Naroli Arcade 19/1 Manoramaganj Palasia Square Indore 452 001	Member (Life)	M P	F.0815(L)	Stan Alvares 1 Lily Kot 15 Meera Baug Santa Cruz (W) Mumbai 400 054	Fellow (Life) from M.1440(L)	Mumbai
M.1834(L)	Nishant Gupta Degree Day Engineers EW-58, Scheme No. 94E Ring Road Indore	Member (Life)	M P	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>NEW MAILING ADDRESS</p> <p>ISLE A 448 Basement Defence Colony New Delhi 110 024 Tel: 46562981/82 Email: isledel@vsnl.com</p> </div>			
M.1835(L)	Mukesh Vaish Sai Shanti Kunj 12 Kalpana Lok Colony Khajrana Road Indore 452 001	Member (life)	M P				
M.1836(L)	Rohit Dolatrai Desai Electrotech Consultants 130 New Apollo Industrial Estate Mogra Lane Off Nagardas Cross Road Andheri (E) Mumbai 400 069	Member (Life)	Mumbai				
M.1837(L)	Devendra Sharadkumar Deo Rainbow Collections Shop No. 4 127/7 Dhanurdhari Samarth Nagar Aurangabad	Member (Life)	Mumbai				
M.1838(L)	Manoj Bubna 209 Highway Rose Society 92 Dixit Road Vile Parle (E) Mumbai 400 059	Member (Life)	Mumbai				

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