Global Lighting Visions
Indian Scenario

DOE SSL R&D Workshop February 4th , 2016

Venkata Atluri

MIC Electronics Limited, India

February 4th, 2016

Outline

- **Indian Power Outlook**
- **Indian Lighting Industry**
- **Government Initiatives**
- **Regulatory, Certifying & Industry Bodies**
- **Conclusion**

India Power Outlook

Energy demand and generation in TWh by Sector

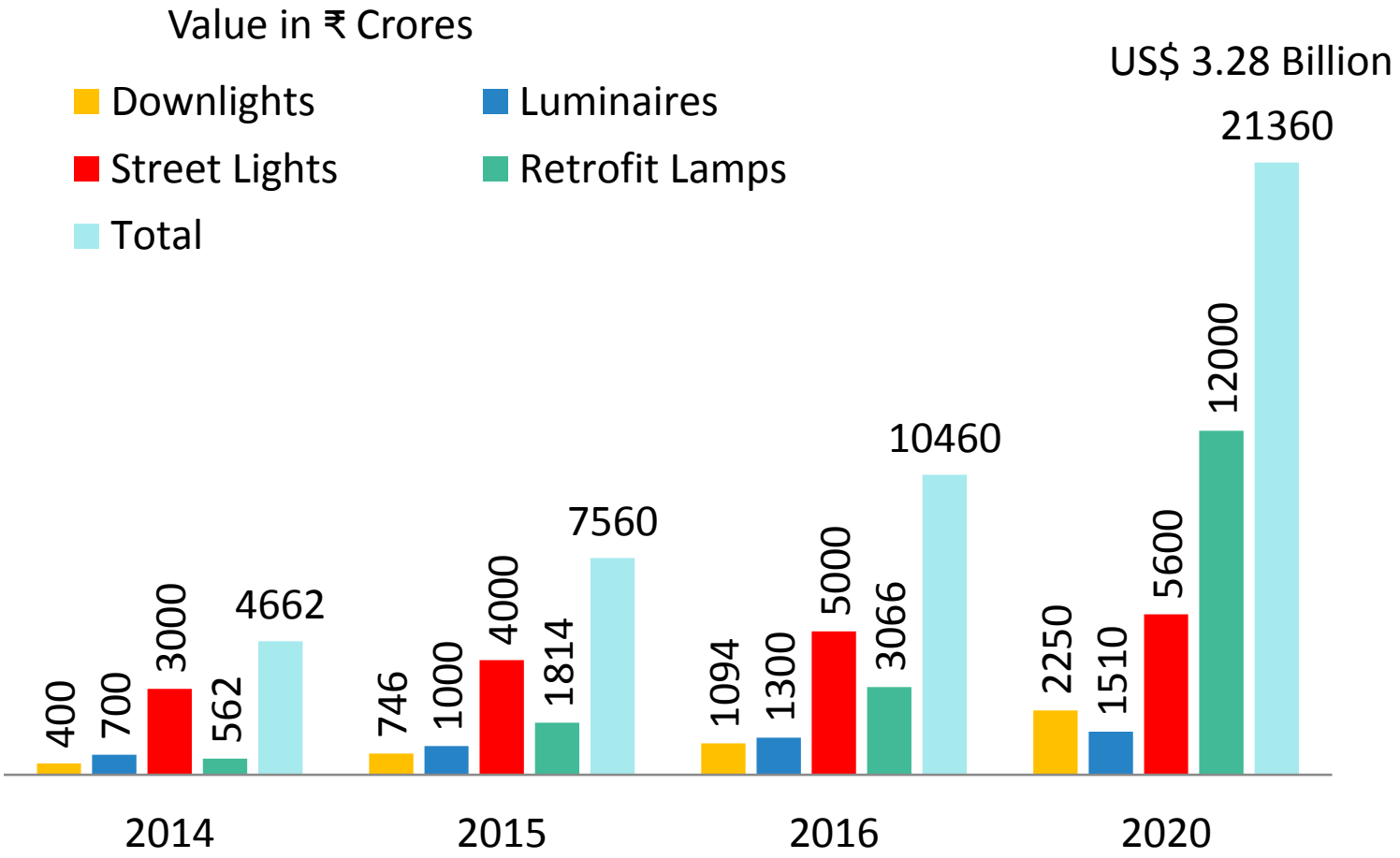
	2000	2013	2020	2030	2040	2013-2040 Change	2013-2040 CAAGR*
Demand	376	897	1 351	2 241	3 288	2 390	4.9%
Industry	158	375	565	904	1 277	902	4.6%
Residential	79	207	329	647	1 115	908	6.4%
Services	46	133	207	332	450	318	4.6%
Transport	8	15	20	24	30	14	2.5%
Agriculture	85	160	222	324	401	241	3.5%
Other energy sector	0	6	8	10	13	7	2.7%
T&D losses	155	220	313	452	613	393	3.9%
PG own use	40	82	107	160	229	147	3.9%
Gross generation**	570	1 193	1 766	2 848	4 124	2 930	4.7%

- Per capita power consumption: 1010 kWh Vs. 12,133 kWh in USA per year
- 2015 Installed capacity is 281 GW generating 1106 TWh Electricity

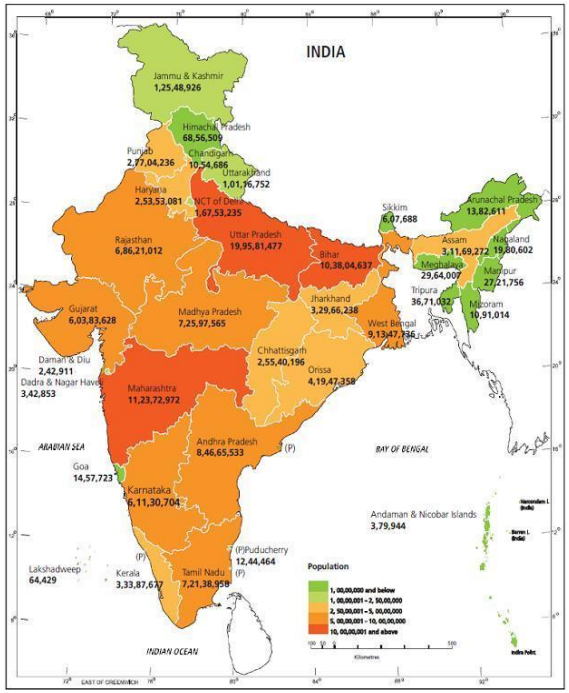
Source: International Energy Agency

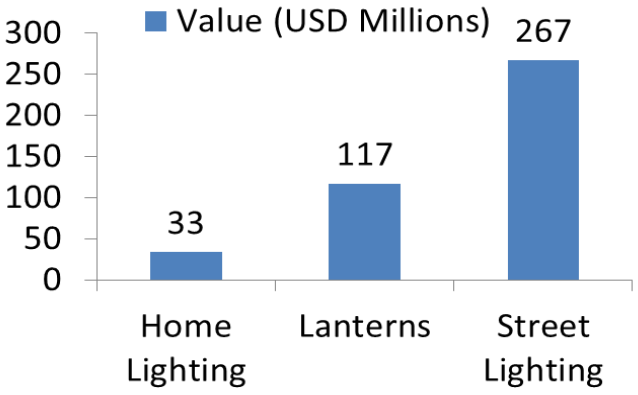
LED business projection in India Year 2020

Source: ELCOMA



India Rural Lighting Market





- 360M without access to electricity
- 80M House holds no access to electricity grid
- Additional 20M with little access to electricity (<4hrs)
- Largest population with no electricity
- kerosene is the primary fuel lighting
  - Consuming 2.4 billion liters per annum and emitting over 5.9M tonnes of CO_2
  - Bad for health and dangerous causing over 300K accidental burns
- ₹ 24800 Crore Subsidy towards Kerosene
- Pico/Micro Grids coupled with LED Lighting solutions provide an excellent solution
- Solar Home Systems

Regulatory, Certifying & Industry Bodies

- Bureau of Energy Efficiency (BEE) - beeindia.gov.in
  - Drive national Policies and Strategies for energy conservation and reducing energy intensity
- Bureau of Indian Standards (BIS) - www.bis.org.in
  - Thrust to standardization and quality control including LED lighting and accessory standards
- Ministry of New and Renewable Energy (MNRE) - www.mnre.gov.in
  - Develops and deploys new and renewable energy for supplementing country's energy requirements
- Energy Efficiency Services Limited (EESL) - www.eeslindia.org
  - Primary organization for ESCO services
- Industry Associations
  - LED product Manufacturers' Association (LEDMA) - www.ledma.in
  - Electric Lamp and Component Manufacturers Association of India (ELCOMA) - www.elcomaindia.com

Indian Standards On LED

Sl. No.	Title of standard	International Standard/ Indian Standard	Degree of Equivalence
1	Terms and definitions	IEC 62504 TS IS 16101:2012	Identical
2	Self-ballasted LED-lamps for general lighting services Part 1 - safety requirements	IEC 62560 IS 16102 (Part 1):2012	Modified
3	Self-ballasted LED-lamps for general lighting services Part 2 Performance requirements	IEC 62612 IS 16102 (Part 2):2012	Modified
4	LED modules for general lighting– Safety specifications	IEC 62031 IS 16103(Part1)	Modified
5	LED modules for general lighting Part 2 performance requirements	IEC 62717 IS 16103(Part2)	Modified
6	DC or AC supplied electronic control gear for LED modules – performance requirements	IEC 62384 IS 16104:2012	Modified

Indian Standards On LED

Sl. No.	Title of standard	Corresponding Int'l Standard	Degree of Equivalence
7	Method of measurement of lumen maintenance of solid state light (LED) sources	LM 80 IS 16105:2012	Equivalent
8	Electrical and Photometric Measurements of Solid-State Lighting Products	LM 79 IS 16106 :2012	Equivalent
9	LED luminaires for general lighting purposes part 1 safety requirements	34D/950/NP IS 16107(Part 1)	Modified
10	LED-luminaires for general lighting Part 2 Performance requirements	34D/977/DC IS 16107(Part 2)	Modified
11	Photobiological Safety of LED and LED systems	IEC 62471 IS 16108:2012	Identical

Starting March 1st, 2016 all LED Luminaires must be registered with BIS under the Compulsory Registration Scheme, meeting appropriate standards for sale in India.
Government subsidizing establishment of LED test facilities at existing Test Lab

Indian Government Initiatives

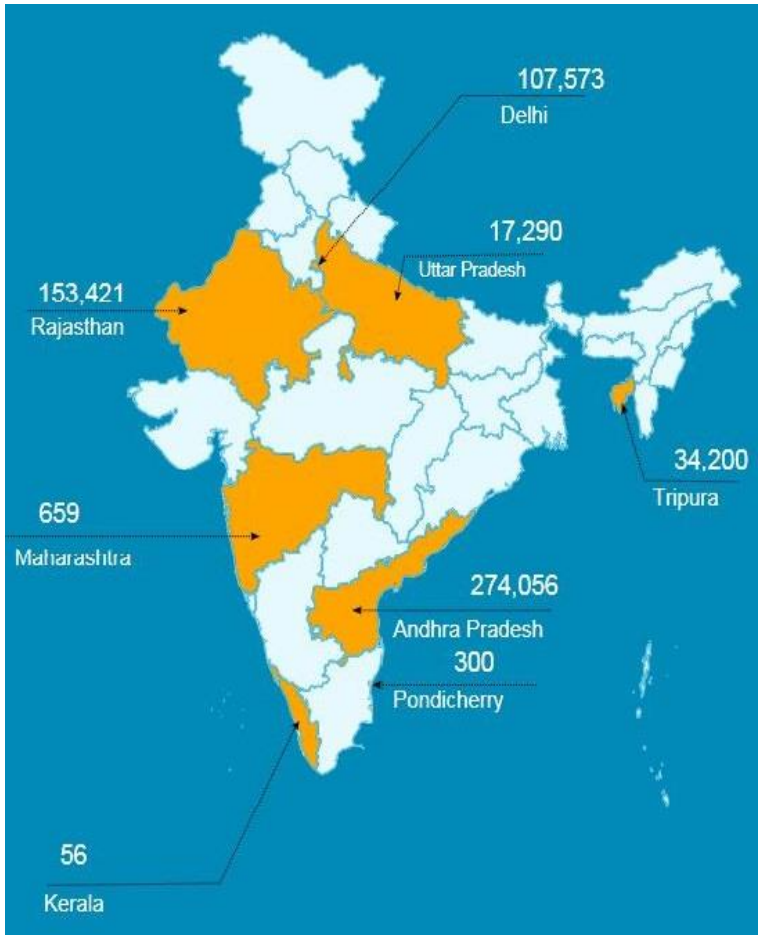
- Ministry of Commerce issued notification to Delhi Government to ensure all showrooms or show windows to use LED down lighters. More States to follow
- Ministry of Urban Development to ensure all medium and small municipalities change to LED Street Lighting
- Provide Preferential Market Access (PMA) for LED lighting products
  - Starts at 50% BOM cost domestically manufactured and goes up every year.

Indian Government Initiatives

- Modified Special Incentive Package Scheme M-SIPS
  - LED Fab crossing ₹ 150 Crore investment / OLED Fab crossing ₹ 600 Crore investment
    - 20% of capex + 10% of production subsidy on production turnover
  - LED Packaging crossing ₹ 10 Crore investment
    - 20% of Capex subsidy
  - PCB manufacturing crossing ₹ 5 Crore investment
    - 20% of Capex subsidy + 10% of production subsidy on production turnover
  - Others include Semiconductor wafers, ICs, discretes, passive components, Photovoltaics etc.
  - www.msips.in

Streetlight National Program

Source: EESL



By March 2019

35 million street lights / Savings of 1400 MW

- SLNP target replacement of 9 million street lights
- Annual energy saving of 2400 million KwH
- Reduction of installed street light load of 390 MW

Total Streetlight Completed as on Date: 28/01/2016

588,726

0.363 kWh
Average energy savings per light per day

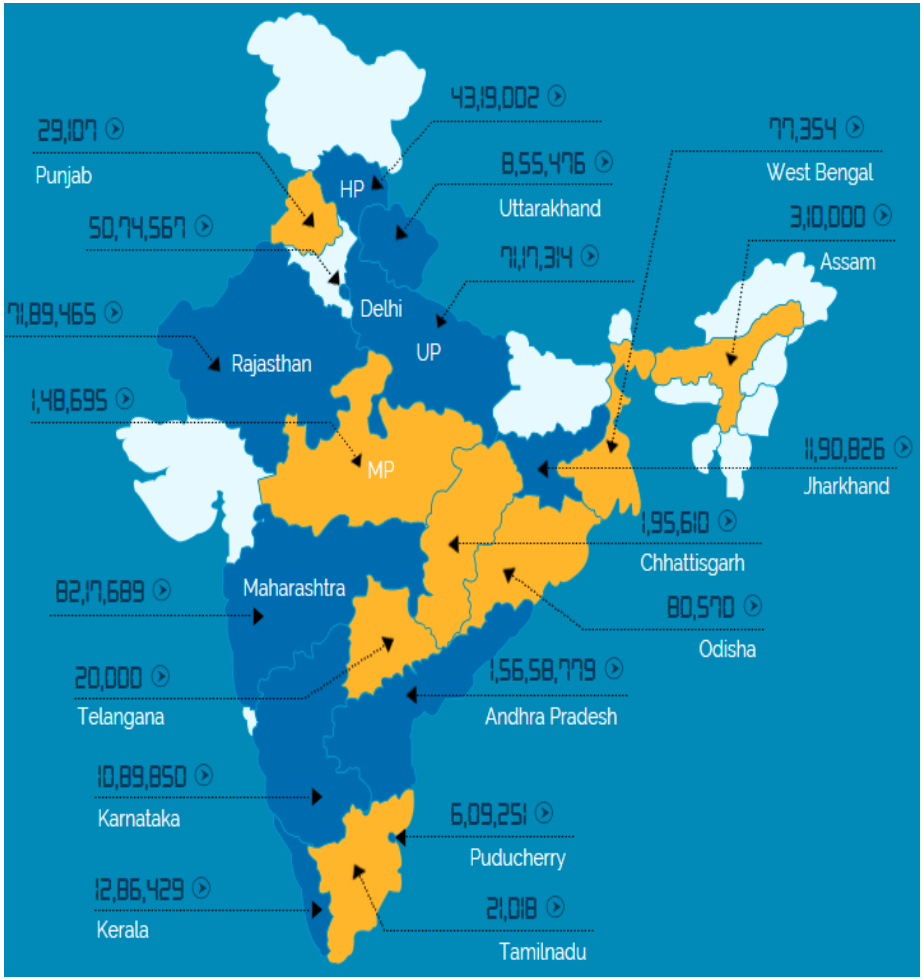
213707.54 kWh
Average Energy Savings per day

19.43 MW
Avoided Capacity

177.38 tCO2
GHG Emissions Reductions

Domestic Efficiency Lighting Program

Source: EESL



770 million conventional bulbs / Savings 100 billion units

- DELP targets 200 million LED Bulbs
- Annual energy savings of 10.5 billion Kwh
- Reduction of installed load of 5000 W

Total LEDs distributed as on 28 JAN 2016 09:45

5,34,90,381

1,89,03,501 KWh

Energy saved per day

INR 7,43,23,415

Cost saving per day

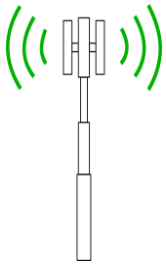
1,676 MW

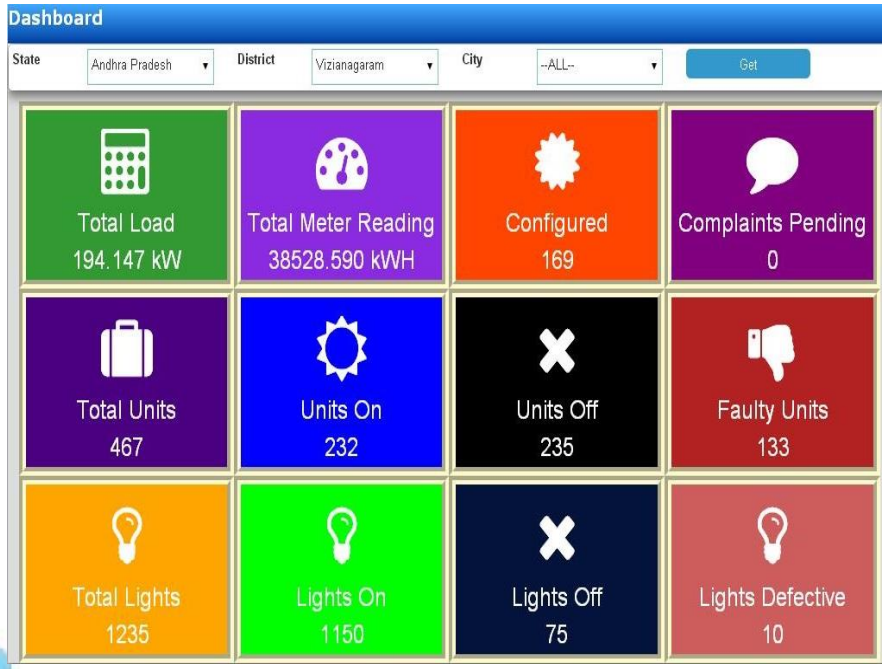
Avoided Peak Demand

15,466 t CO_2

CO_2 Reduction per day

Centralized control and Monitoring System - CCMS



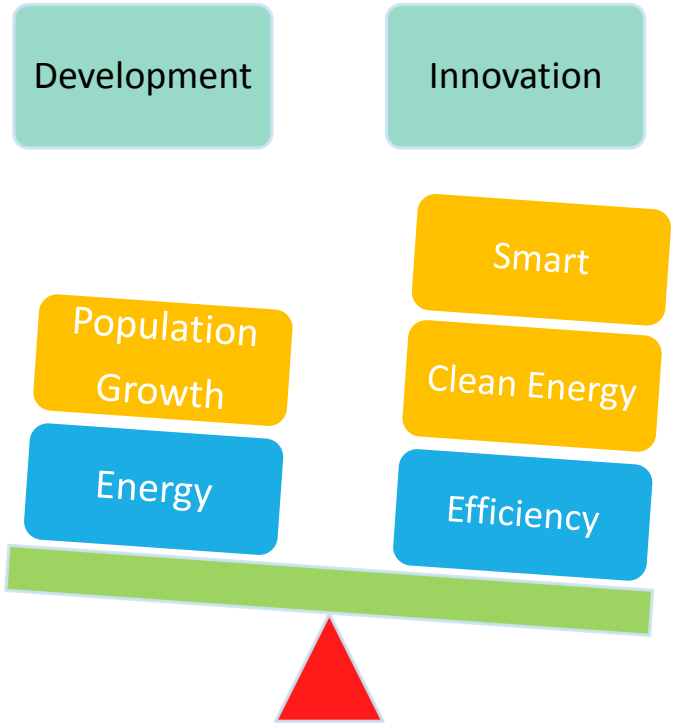


- Ensures service level guarantees and accountability
- Manages Energy losses from theft, vandalism, disasters etc.
- Ties into smart grid for smart cities.

- GPRS Bi-Directional Communication
- Programmable Automatic and Manual On/Off
- Energy monitoring
- Health monitoring
- Auto reporting of light failures thru SMS and emails

Conclusion – Growth / Thrust Areas

- Manufacturing Automation
- LED packaging
- Drivers, Power Conditioning, Surge protection
- Energy monitoring and management solutions
- Rural lighting
- efficient energy storage
- Architectural / Commercial lighting solutions
- Connectivity solutions thru lighting
- Brushless DC (BLDC) Fans



Thank You

Venkata Atluri
Email: atluri@mic.co.in / atluri@yahoo.com
Mobile: +1 408.829.6500