



Need for collective efforts to nurture LED eco-system in India

A Presentation to ELCOMA

by

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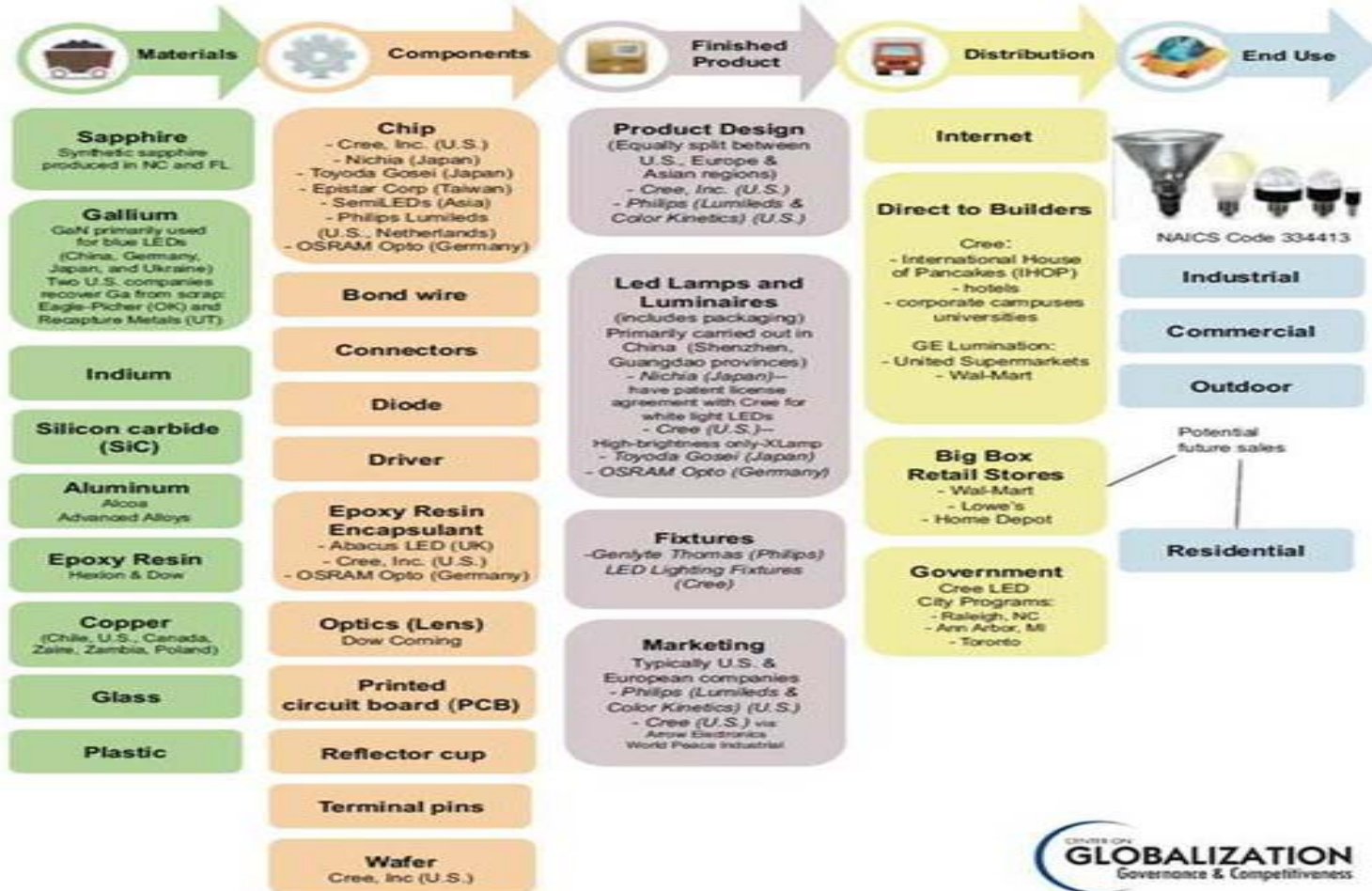
President, LEDMA

MIC Electronics Limited, CMD,

Outline of Presentation

1. LED Eco-System
2. LEDMA
3. LED Applications
4. LED Lighting
5. Industry perspectives
6. Volume price elasticity
7. Government Help needed

LED ECO System



Source: CGGC, based on company websites, interviews, industry sources, and Sanderson et al., 2008.

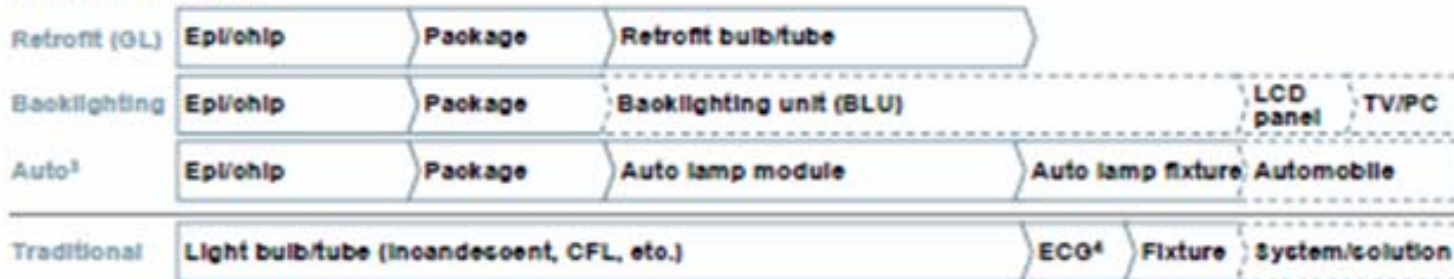


McKinsey Report

LED General Lighting Value Chain



Application specifics



1 The same definition as luminaire

2 Fixtures have a minimum number of external control components, but a more sophisticated controller/system can be added to LED lighting

3 Exterior lighting example

4 Electronic control gear (ballasts)

SOURCE: Amadeus, Bloomberg, analyst reports, expert interviews, Strategies Unlimited, team analysis

Need to nurture

Nurturing such an ecosystem for LED will ensure that we are self reliant, create opportunities for employment, reduce the costs of the product and increase the GDP of the country. While in other technologies we have missed the bus (and there are huge insurmountable gaps), in the case of LEDs it is still possible to catch up with the best in the world – with the collective efforts of all the stakeholders in the country, including
Government of India

Industry Capability

- **India has the needed development and manufacturing talent to realize high quality products to match the best in the world in performance.**
- **There is increased awareness in the user communities about the efficacy of LED products.**
- **The efficiencies of LEDs are going up substantially.**
- **Initial high cost is likely to be an entry barrier for LED products.**
- **Larger volumes, achieved at an accelerated pace will help reduce prices.**

LEDMA – main purpose

To help Indian industry become truly a Global player in all LED products and to provide price safeguards in the Country by realising customised and India specific products, through collective efforts and help from the Govt. of India.

LEDMA and its Objectives

- To put India on par with the advanced countries in this field
- To establish a strong and comprehensive indigenous manufacturing base
- To provide Price safeguards to the Nation to counter MNCs
- Customisation to meet the Indian needs – Rural / Urban at an affordable cost
- To help prevent proliferation of substandard products
- To conform to International IP Regulations and protect Indian IP
- To create substantial employment opportunities
- To promote the LED concept in a big way in India and attract quality Indian manufactures to enter this field to support the Indian needs
- Support to bring the appropriate LED standards to match the international standards
- To bring in together LED test facilities to the various manufacturers at affordable cost
- To create awareness and to promote extensive usage of LED in India

LED Application Areas

LEDs can be used for a host of applications ranging from automobile lighting to large screen displays



This includes automotive interior and exterior lighting comprising emergency vehicles, signalling, rear lighting, forward lighting and headlamps



Mobile Appliances

One of the most widespread application of LED is its use in various types of handheld or mobile devices such as personal digital assistants (PDAs), mobile phones and digital cameras

Automotive

Illumination



This includes lighting applications in architecture, retail displays, consumer portables, safety and security, residential, entertainment, outdoor area, off-grid, lanterns and street lighting

Signals



LEDs are used in traffic lights and railway, transit and pedestrian signals

Signs/Signage and Displays

This comprises LED panels used as stadium displays, large television displays, electronic billboards and dynamic decorative displays Backlighting for LCD televisions and laptop displays; message displays at airports and railway stations; and destination displays for trains, buses, trams and ferries are also included in this category

Other Applications

LEDs are also used in several other applications such as remote controls for televisions, pulse oximeters for measuring oxygen saturation, movement sensors and in phototherapy for acne



Source: 'The Market Outlook for High-Brightness LEDs in Lighting Application', Strategies Unlimited (May 2007)

HB LED Market Segments

Signs & Displays



Mobile



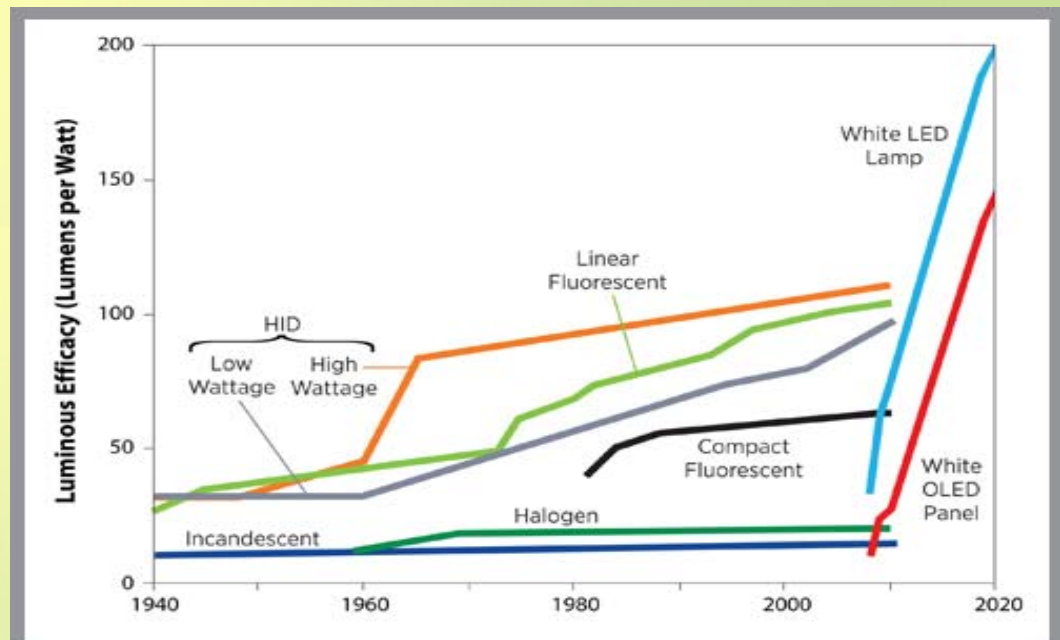
Automotive



LED Lighting

Benefits

- Up to 90% power savings
- 15 years life time
- Maintenance free
- Mercury free
- Eligible for carbon credits
- Intelligent Control
- Green Energy

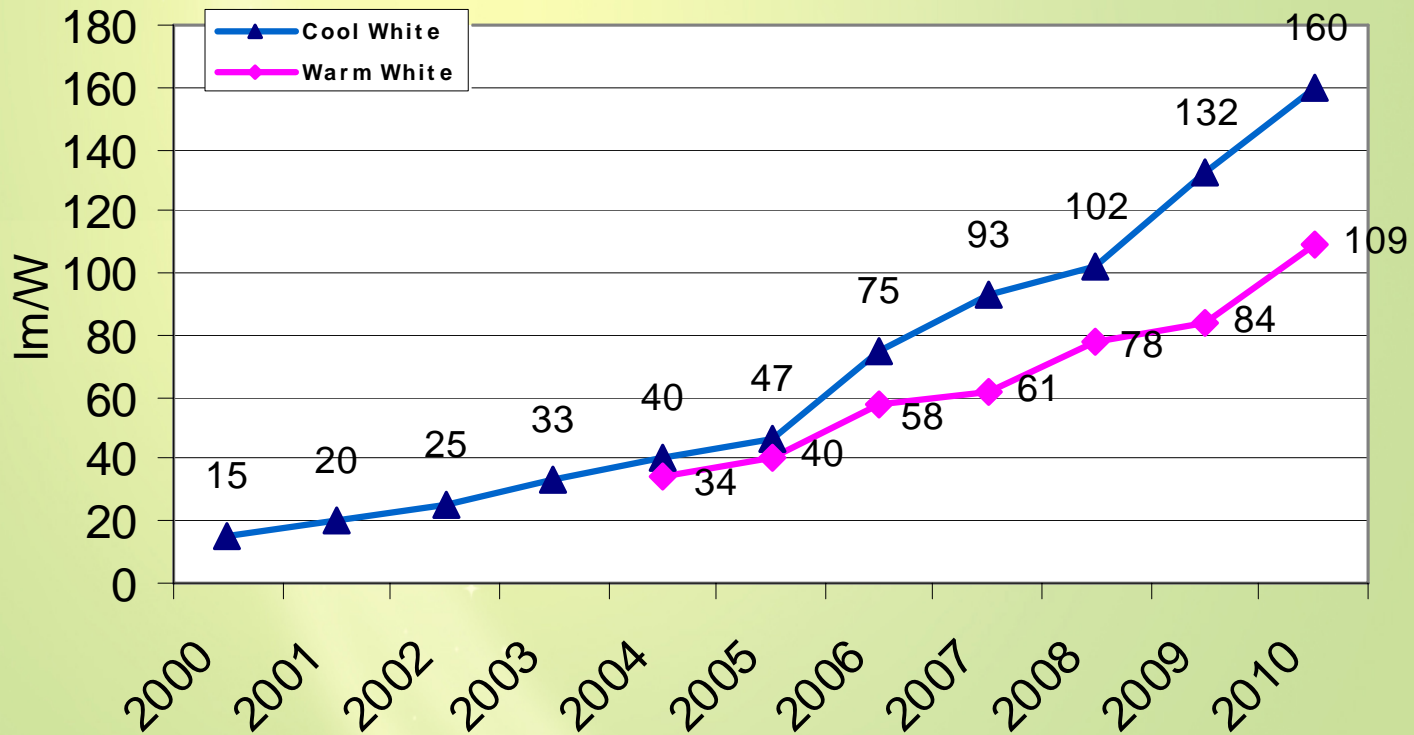


While traditional lighting technologies are relatively mature and offer less potential for improvement, SSL is still at a comparatively early stage and continues to achieve dramatic advances in efficacy.

Source: DOE SSL R&D Multi-Year Program Plan

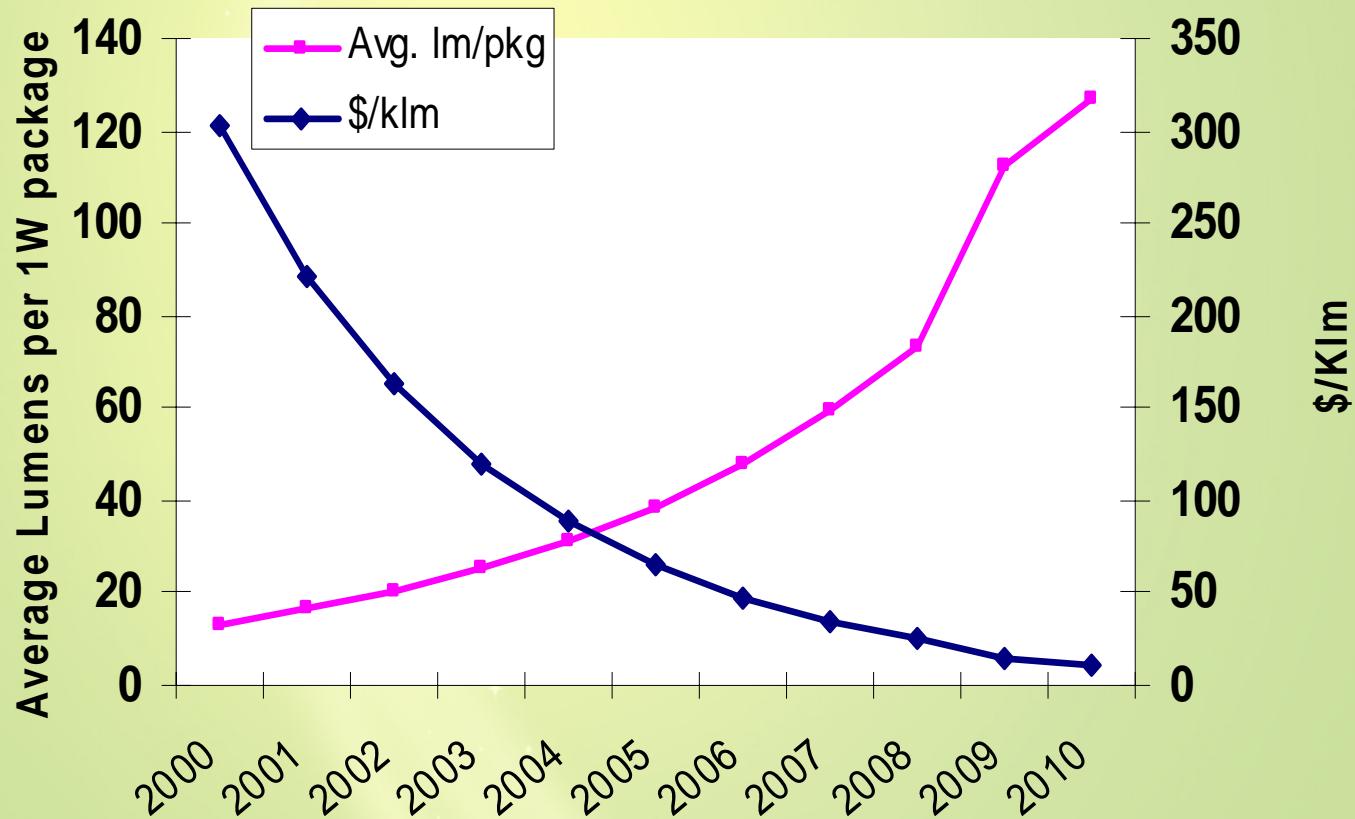
Efficiency

EVOLUTION OF WHITE LED LUMINOUS EFFICACY BEST AVAILABLE COMMERCIAL PRODUCTS

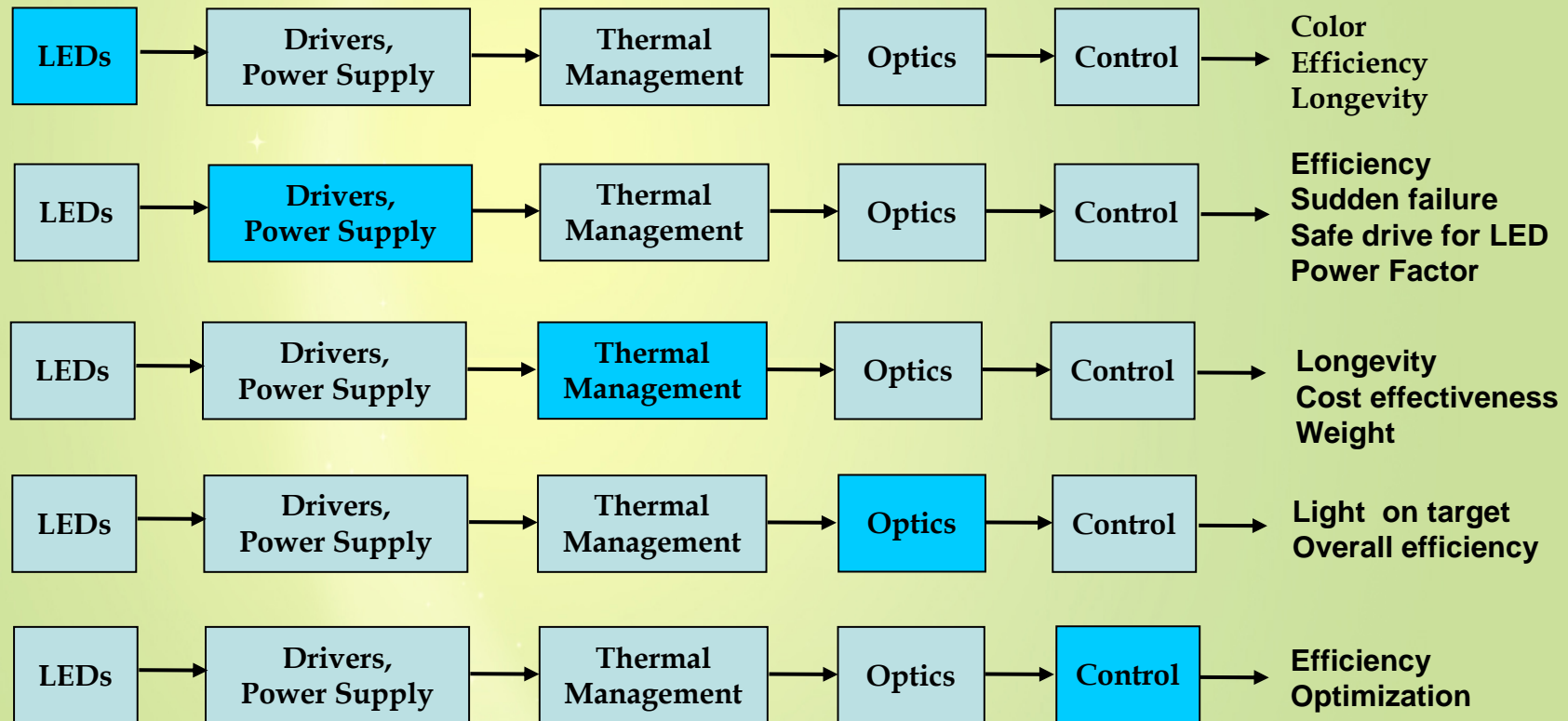


Efficiency/Cost

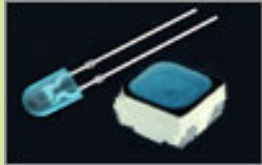
WHITE LED TECHNOLOGY AND COST
AVERAGE 1 WATT COOL WHITE LED PACKAGE



LED Lighting core requirements



Elements of LED Module



Nichia – InGaN LEDs



Philips Lumileds
Luxeon Rebel

LED Packages

+



Cree-XLamp MPL
Easy White

Seoul
Z-power
set &
High-Flux
LEDs



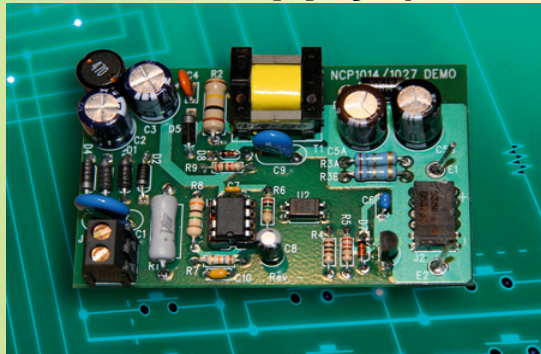
Power Supply (Driver)

+

Optics

+

Thermal Management



ON Semiconductor



L₂ Optics



Khatod



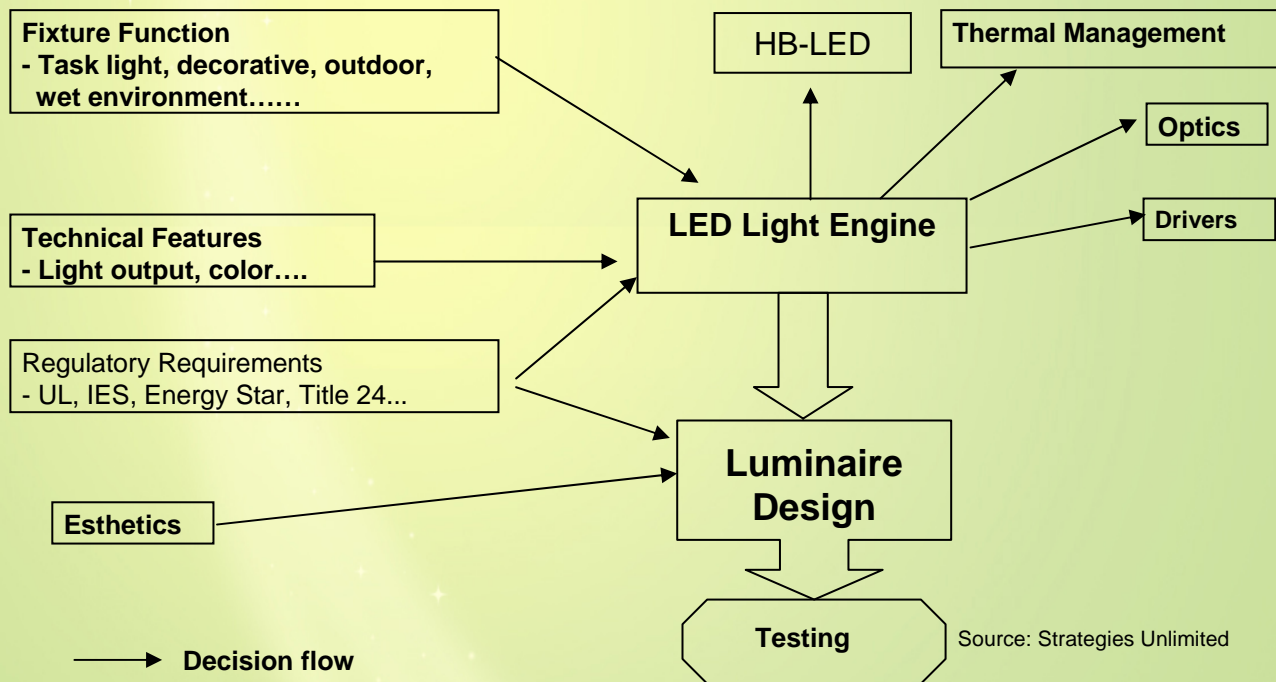
Sapa



Synjet

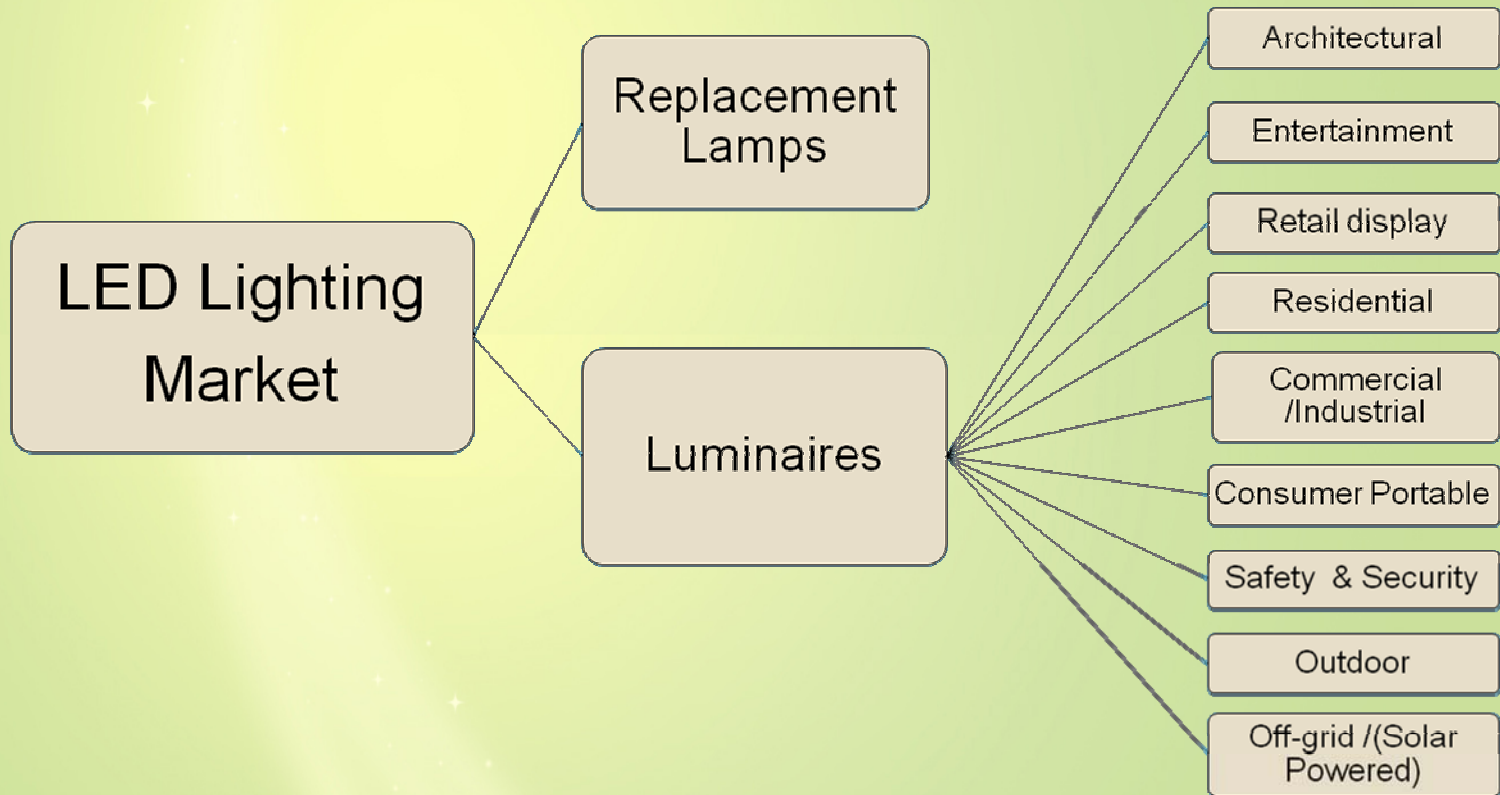
LED Lamp & Luminaire Design Elements

Solid-State Lighting: LED Luminaires and Replacement Lamps



LED Lighting Market

By Applications



About LED Lighting

Estimated Life Cycle Costs of Lighting Devices

| Device | Average Lumen Efficiency (Lm/W) (A) | Wattage to match desired Lumens (B) | Rated Life (hours) (C) | Energy Use over device life (kWhr) (D) | Initial Cost (INR) Per Unit (E) | Life Cycle Energy Use Cost (INR) (F) | Number of Lighting Devices to Match LED Life (G) | Overall Life Cycle Cost to match LED life INR (H)=(E+F)G |
|--------|-------------------------------------|-------------------------------------|------------------------|--|---------------------------------|--------------------------------------|--|--|
| ICL | 10 | 60 | 1,000 | 60 | 10 | 300 | 50 | 15,500 |
| CFL | 40 | 15 | 6,000 | 90 | 75 | 450 | 8 | 4,400 |
| LED | 85 | 7 | 50,000 | 350 | 750 | 1,750 | 1 | 2,500 |

Assumptions: Usage in a Year (days) 300
 Baseline ICL Wattage (W) 60
 Desired Lumens per device (Lm) 600
 UI and Household Tariff differential (INR/kWhr) 5

LED Lighting and Energy Savings

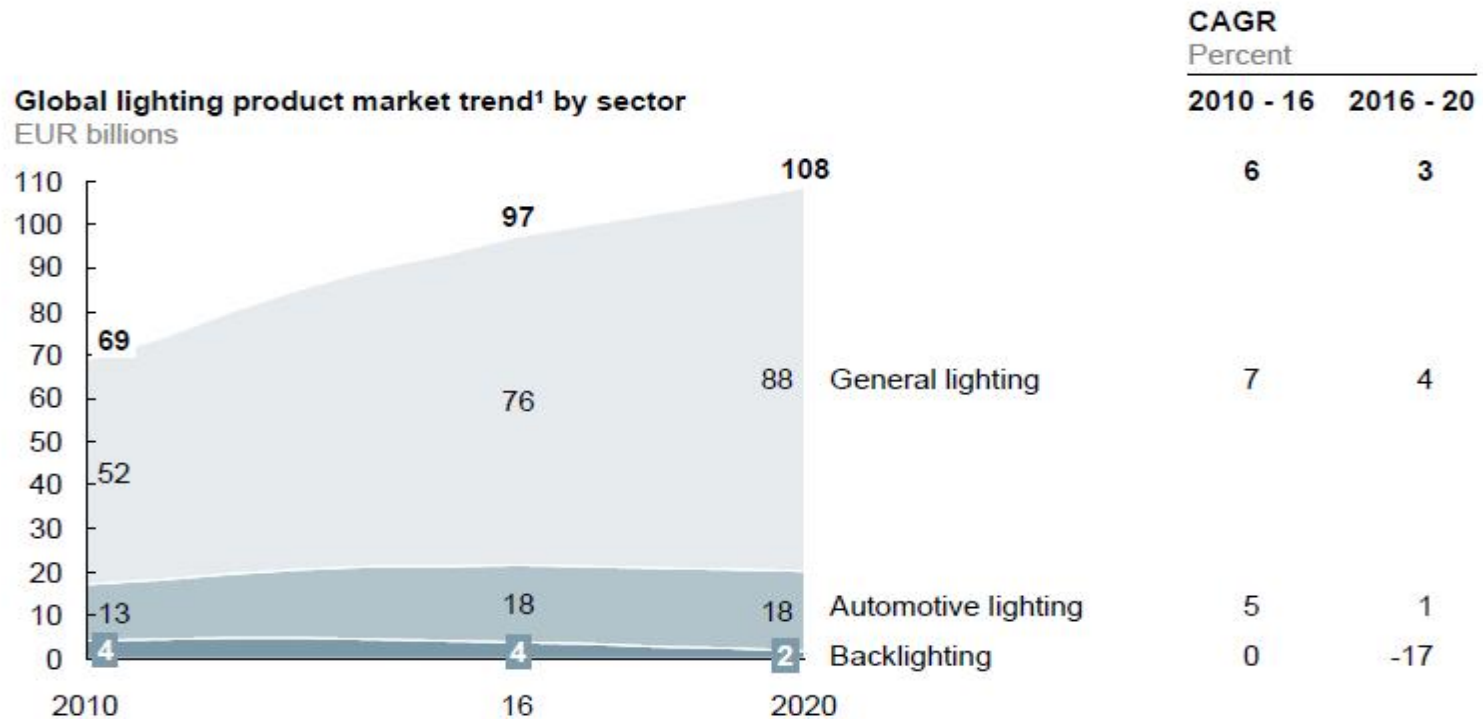
- **Lighting load forms around 25% of the electrical energy consumption**
- **Sooner the LED Light penetration, greater the energy savings for the country**
- **Initial high cost can be the only entry barrier – especially in the domestic segment.**
- **Volumes can help reduce the prices at an accelerated pace.**
- **Industry will do its best. With the help of the Government, the progress can be faster.**
- **Government will more than gain in the cost of setting up new power plants because of savings in energy consumption through LED**

Industry Perspectives

- Global population growth and urbanization increase the overall demand for lighting products. Lighting business is expected to touch US\$ 150 billion in 2020
- Governments around the world are forcing regulations for energy efficiency
- LED Technology – the 4th generation Technology in Lighting will transform the industry
- Costs are expected to come down by 30% per annum to make LED Lighting Technology affordable
- LED Lighting market will touch almost US\$ 90 billion by 2020 close to 60% of the overall Lighting market
- LED Lighting is expected to grow @ about 35% in the period 2010-16 and achieve a market share of 40% by 2016
- Intelligent Lighting systems offer new growth opportunities

Global Lighting Market Trend

The global lighting market is growing steadily, with general lighting being the major market segment



¹ Total general lighting market (new fixture installation market with light sources and lighting system control components [full value chain] and light source replacement market), automotive lighting (new fixture installations and light source replacement), and backlighting (light source only: CCFL and LED package)

NOTE: Numbers may not sum due to rounding

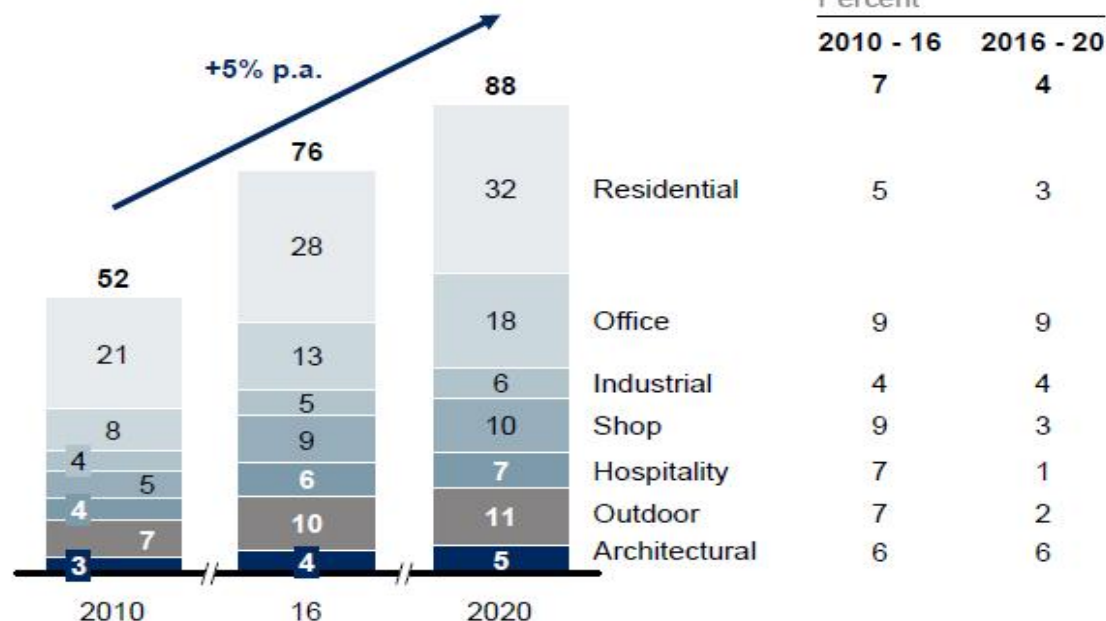
SOURCE: McKinsey Global Lighting Market Model; McKinsey Global Lighting Professionals & Consumer Survey

General Lighting Market Segments

Industry perspectives

Residential is and will remain the largest market segment, followed by office and outdoor

General lighting market trend¹ by application
EUR billions



¹ Total general lighting market: new fixture installation market with light source and lighting system control component (full value chain) and light source replacement market

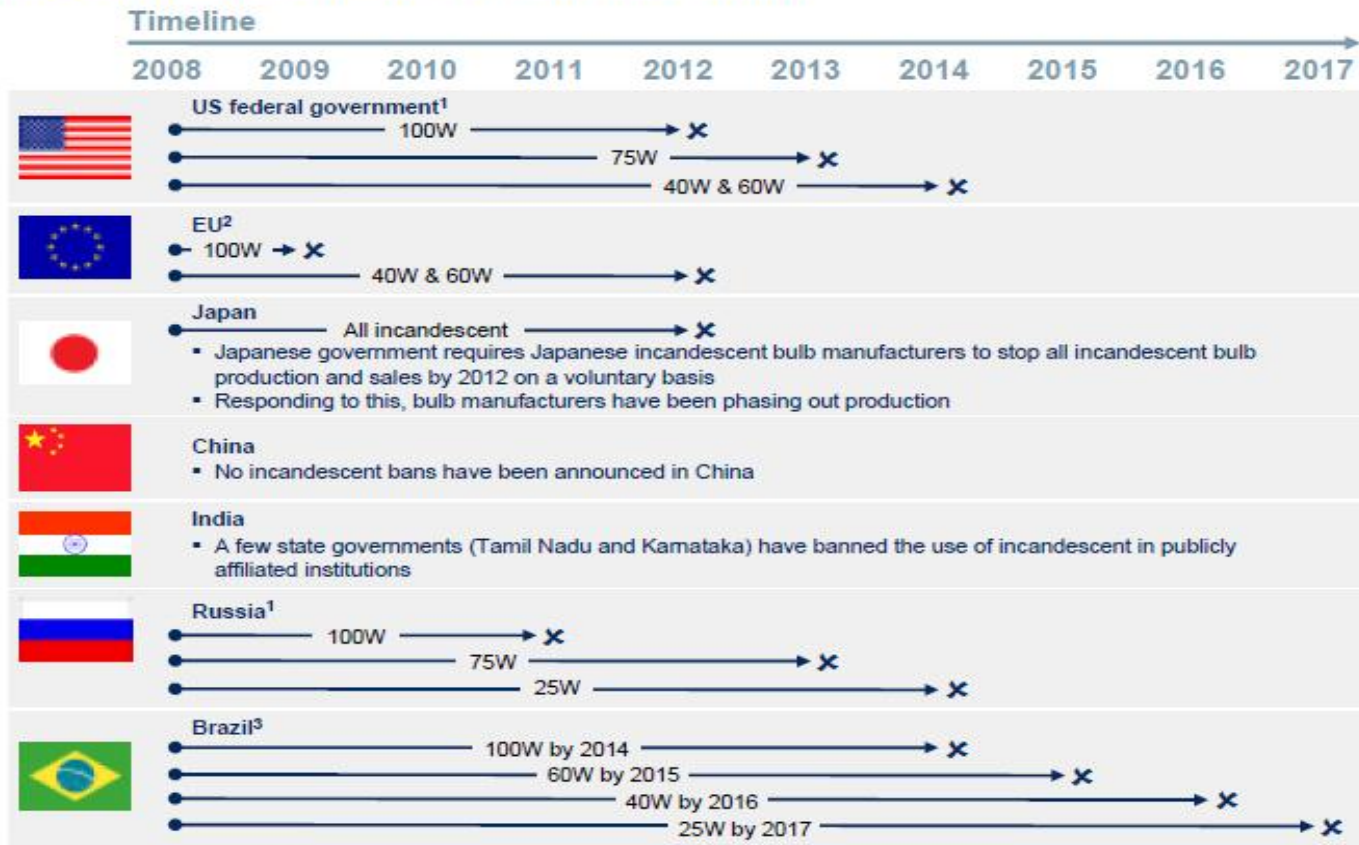
NOTE: Numbers may not sum due to rounding

SOURCE: McKinsey Global Lighting Market Model; McKinsey Global Lighting Professionals & Consumer Survey

Banning the Bulb

Incandescent ban is now a global movement

● → Time until ban



Time of year the ban comes into effect: 2 End of year
1 January 1 3 June 30

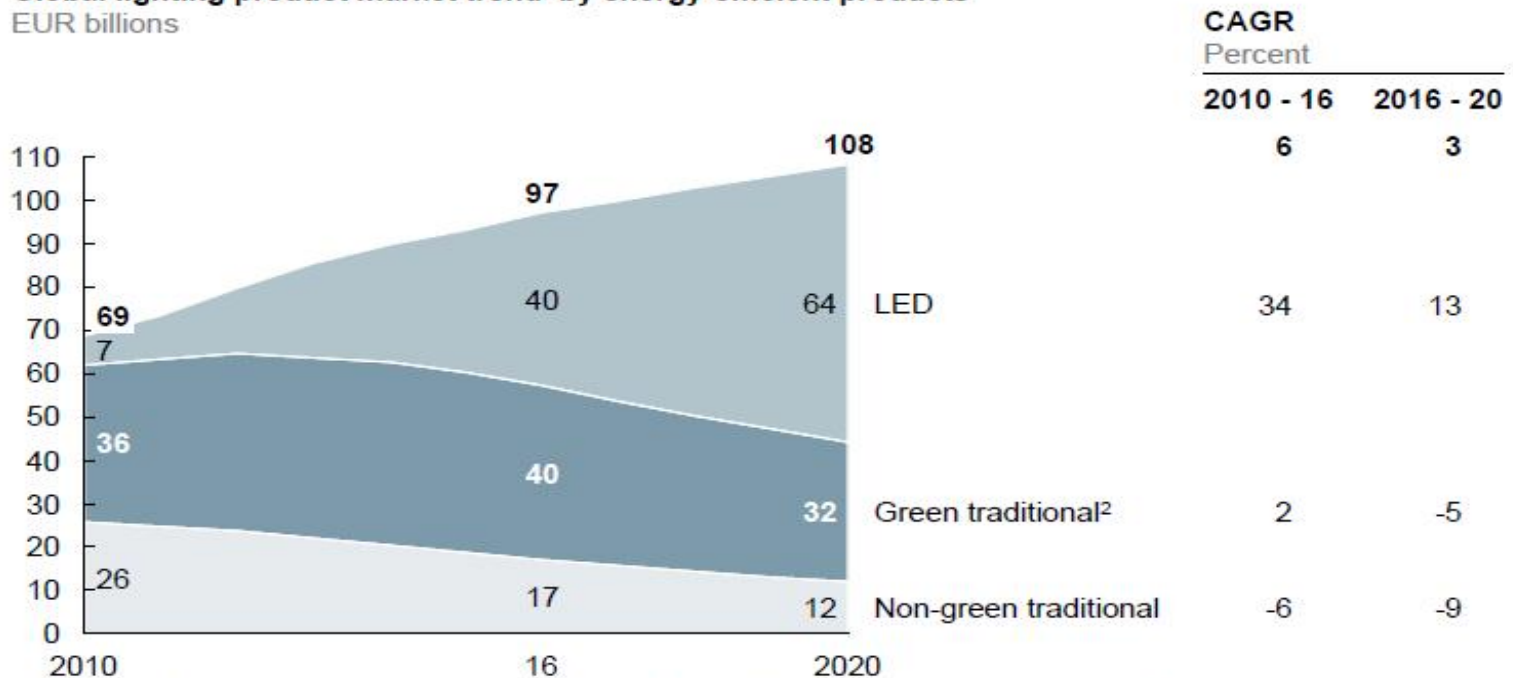
SOURCE: Press search; Credit Suisse analyst report; McKinsey analysis as of June 2011

LED Lighting share

Energy-efficient traditional technologies will play a significant role before LED transition in 3 - 4 years

Global lighting product market trend¹ by energy-efficient products

EUR billions



¹ Total general lighting market (new fixture installations full value chain incl. lighting system control components, and light source replacements), automotive lighting (new fixture installations and light source replacement), and backlighting (light source only: CCFL and LED package)

² Due to the broad range of different lighting products, green is defined per product group in line with typical energy efficiency standards within the industry, e.g., Energy Star for CFL light bulbs. At the minimum, all green products need to provide an 20% energy efficiency improvement vs. comparable non-green products.

SOURCE: McKinsey Global Lighting Market Model; McKinsey Global Lighting Professionals & Consumer Survey, Industry Experts

Expected help from Government

1. Subsidy on Total Project Cost (*for eco-system creation*)
2. R&D Grants (*for indigenous development*)
3. Green Energy Funding (*by corporates under CSR*)
4. Preferential purchase (*for indigenous products*)
5. Training (*Funding for certification and TOT programmes*)
6. IP Protection (*Subsidies for cost of IP Protection*)
7. Export Policy (*Tax benefit for Exports*)

Expected help from Government – Sales Tax / VAT

The biggest and **serious anomaly** is in the domain of Sales Tax/ VAT. Some LED products especially LED Luminaries being latest products do find place specifically in any Chapter or Heading of Sales Tax/VAT Tariff. Consequently these products are being classified under miscellaneous heading “**not elsewhere specified**” and are subjected to the highest rate of **14.50%**. It may be pertinent to mention here that though the Central Excise duty is @ 4% on LED Luminaries the 14.5% of VAT is negating the concessions offered by the Central Government. Therefore, the Government of India may advise all the State Governments to extend concessions from Sales Tax/VAT to LED industry especially to LED Luminaries on par with solar and other renewable energy sectors.

Expected help from Government – Other Taxes

In order to promote LED Products it is necessary to bring down their cost at consumer level and this will not be possible without reducing the taxes and duties.

Steps suggested are:

- **The LED Products may be categorized into high, medium and low priorities depending upon their applications.**
- **All the components required for manufacture of high priority LED Products may be exempted from entire Customs and Central Excise Duties and components required for medium priority LED Products may be partially exempted from Customs and Central Excise Duties. Similarly concessions may be considered for finished high and medium priority LED Products from Central Excise duty.**
- **Necessary exemptions from Central Excise and Customs Duties leviable on capital goods required for LED Industry may be considered.**
- **All LED Products and their components should be exempted from special additional duty.**

Thank You

