



## LED Business Innovation in Lighting

Roland Michal

# Agenda

**How will LED change our business?**

**Zumtobel´s approach in the LED business**

**Examples for applications of the LED technology**

**Summary and Outlook**

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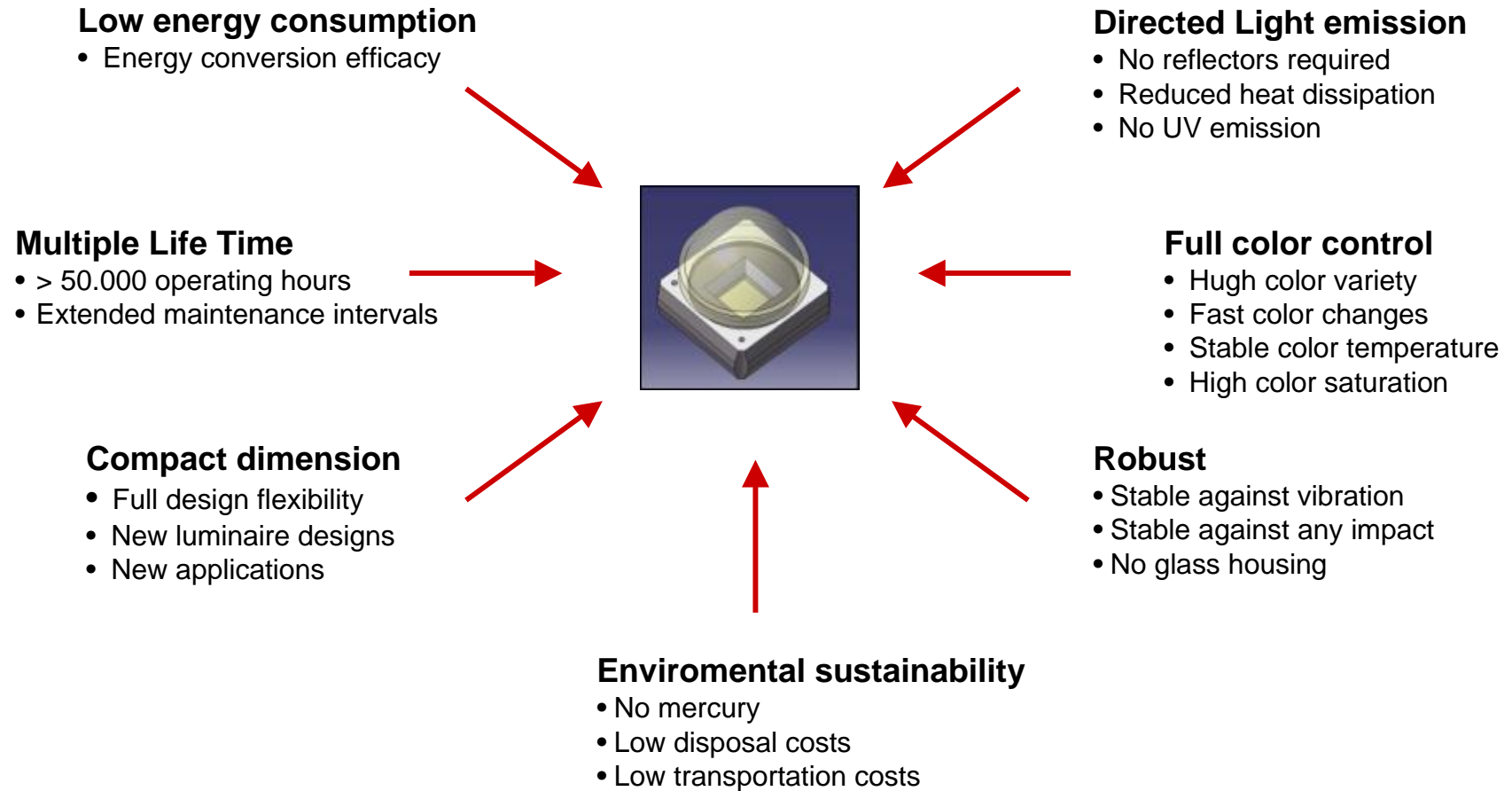
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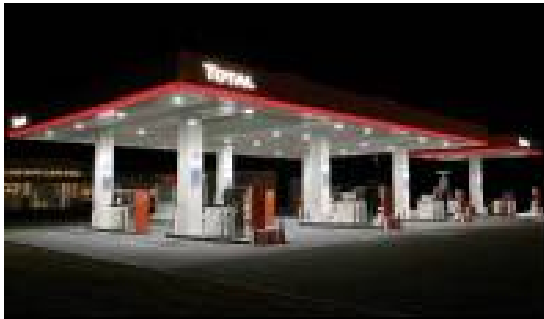
# Advantages of the LED technology

LED is a disruptive technology in the field of lighting



# LED = Energy Savings

Bringing added value to the customer



## Application: Signage

- 90% energy saving
- project Total patrol stations
- 17000 patrol stations world wide



## Application: Vitrines

- 50% energy saving
- flexible colors
- no glass, no mercury



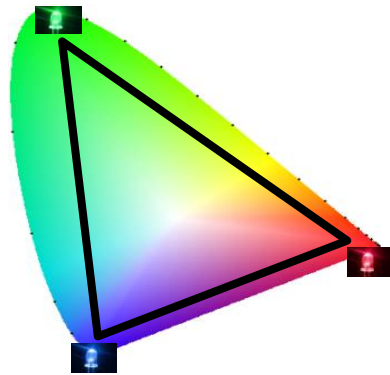
## Application: Retrofit lamps

- 80% energy saving
- improved color feeling

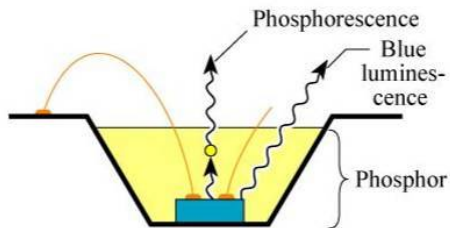
# LED = Full Color Control

## Bringing added value to the customer

White light is generated by mixing R-G-B  
LED technology enable full control on mixing



LED chip produces blue light  
Phosphor covers blue light to white light



LED light is highly saturated ...

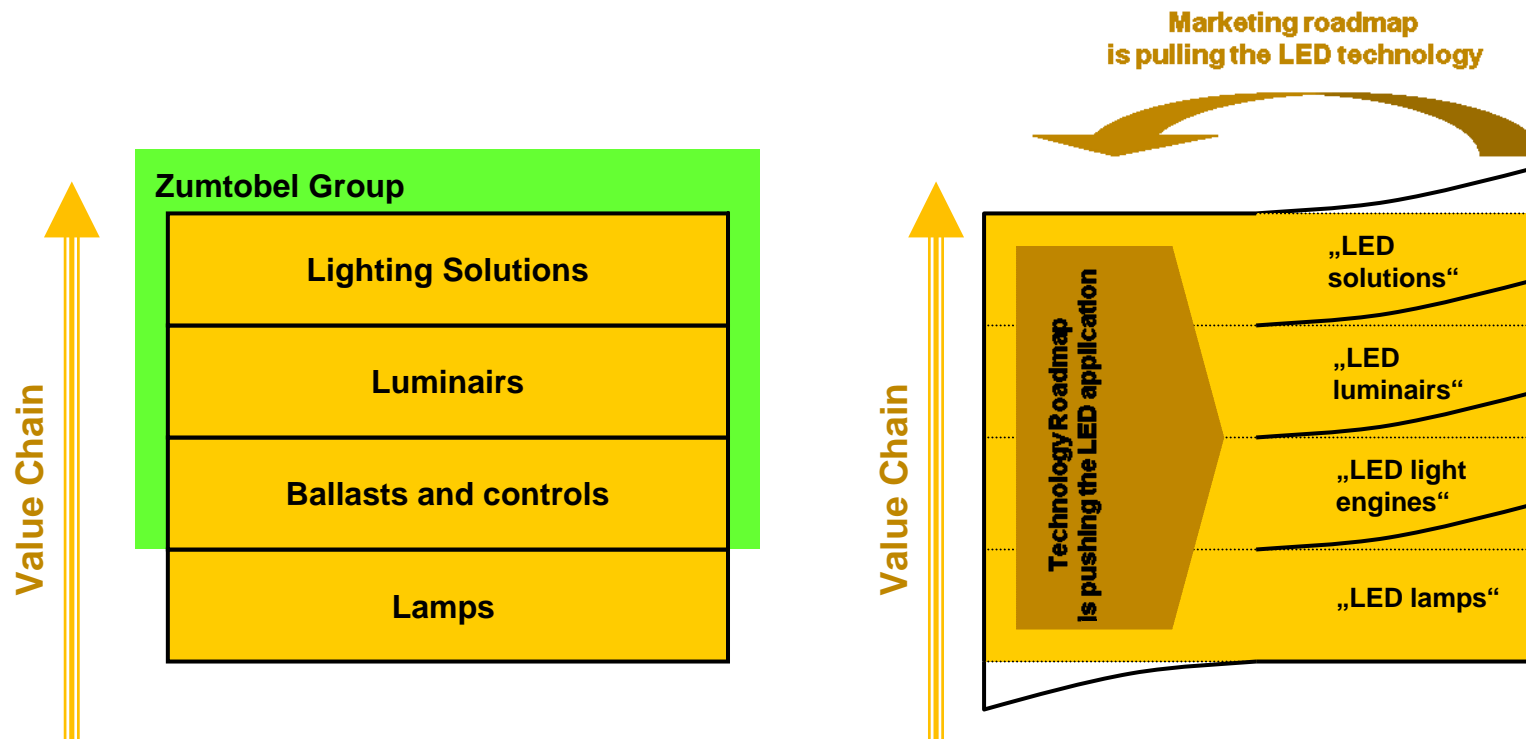


# LED is generating a paradigm shift in the value chain of lighting

Traditional value chain  
in the lighting industry



Value chain for future LED products  
in the lighting industry



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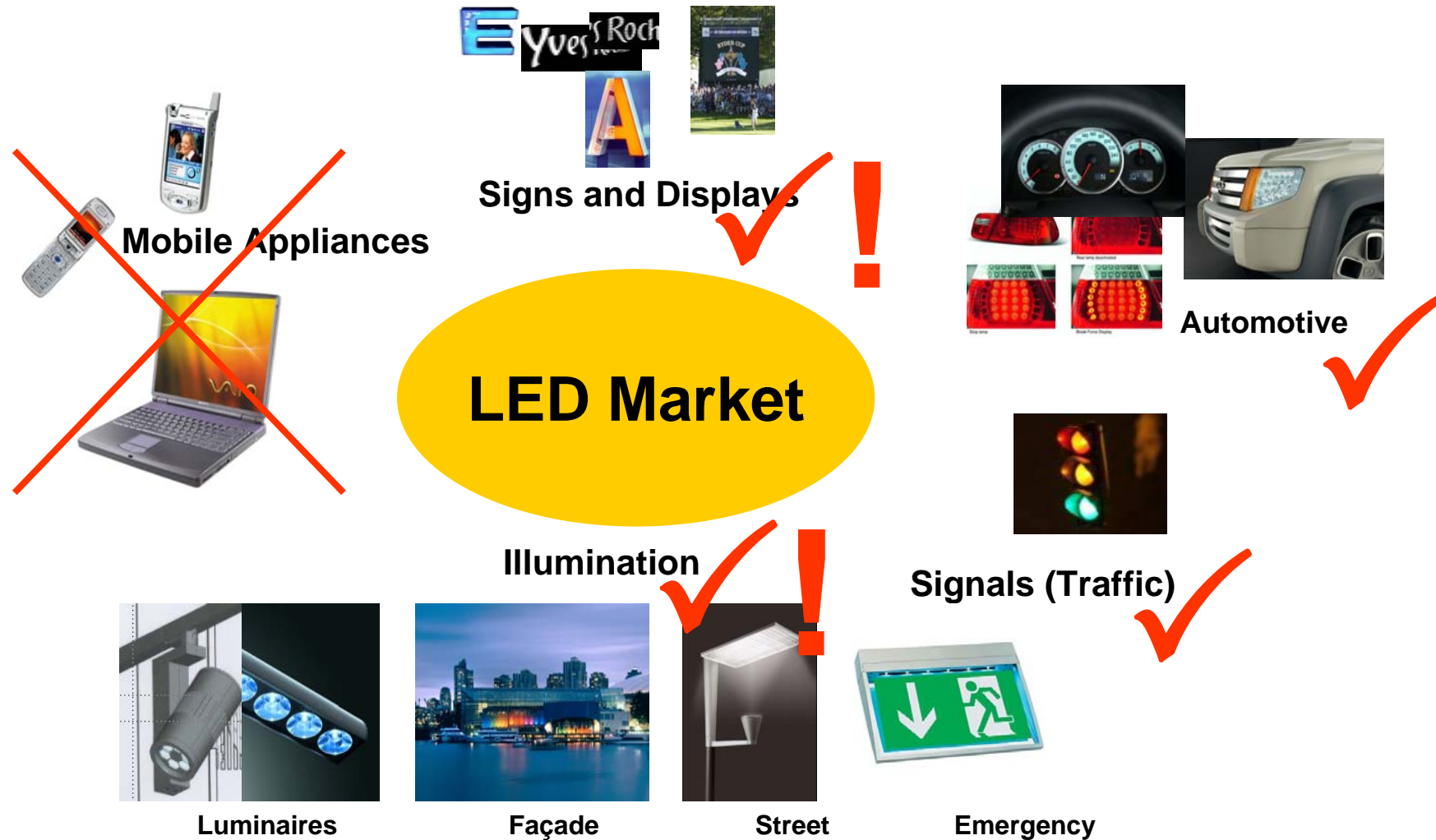
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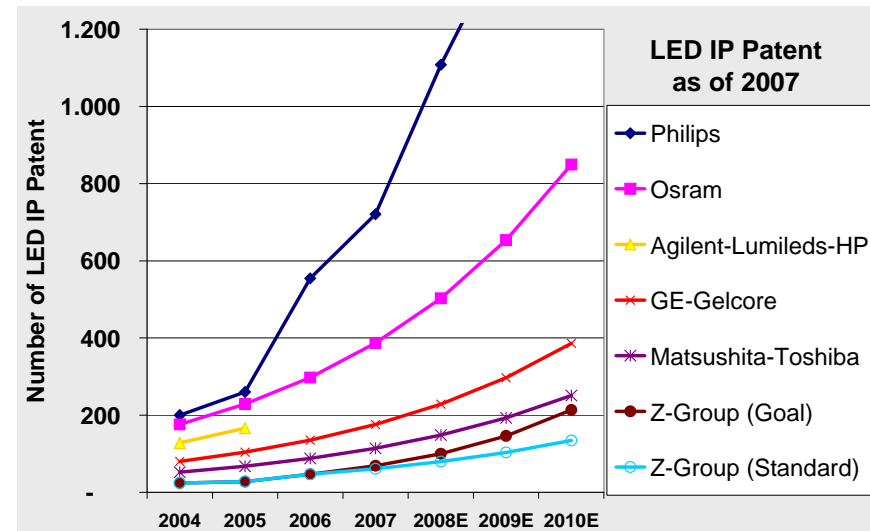
# The market for LED application

Zumtobel has a selected market approach

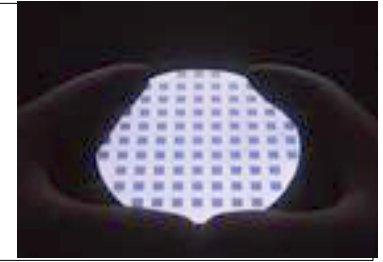


## IPR is a key topic for growing the LED Business

- Working in strong partnerships and heading a technology network
- Zumtobel holds powerful IPR in the field of white color conversion
- Future generation of IPR shall occur in selected areas
  - White color conversion
  - Optics
  - Thermal management
  - LED luminaires and LED applications



# Zumtobel access to LED chips



## Strategic Partnership

- Zumtobel is stepping into the field of LED light sources
- Stepping into the manufacturing of LED chips is not feasible
- Focus on strategic partnerships with leading LED chip manufactures
- Worldwide 5 companies own and share the required IP for LED chip manufacturing
- Zumtobel selected two strategic partnerships

### Toyoda Gosei

- Leading for low and medium power range
- Strong link by the Joint Venture LEXEDIS
- Access to the strong IP-portfolio of TG



### CREE

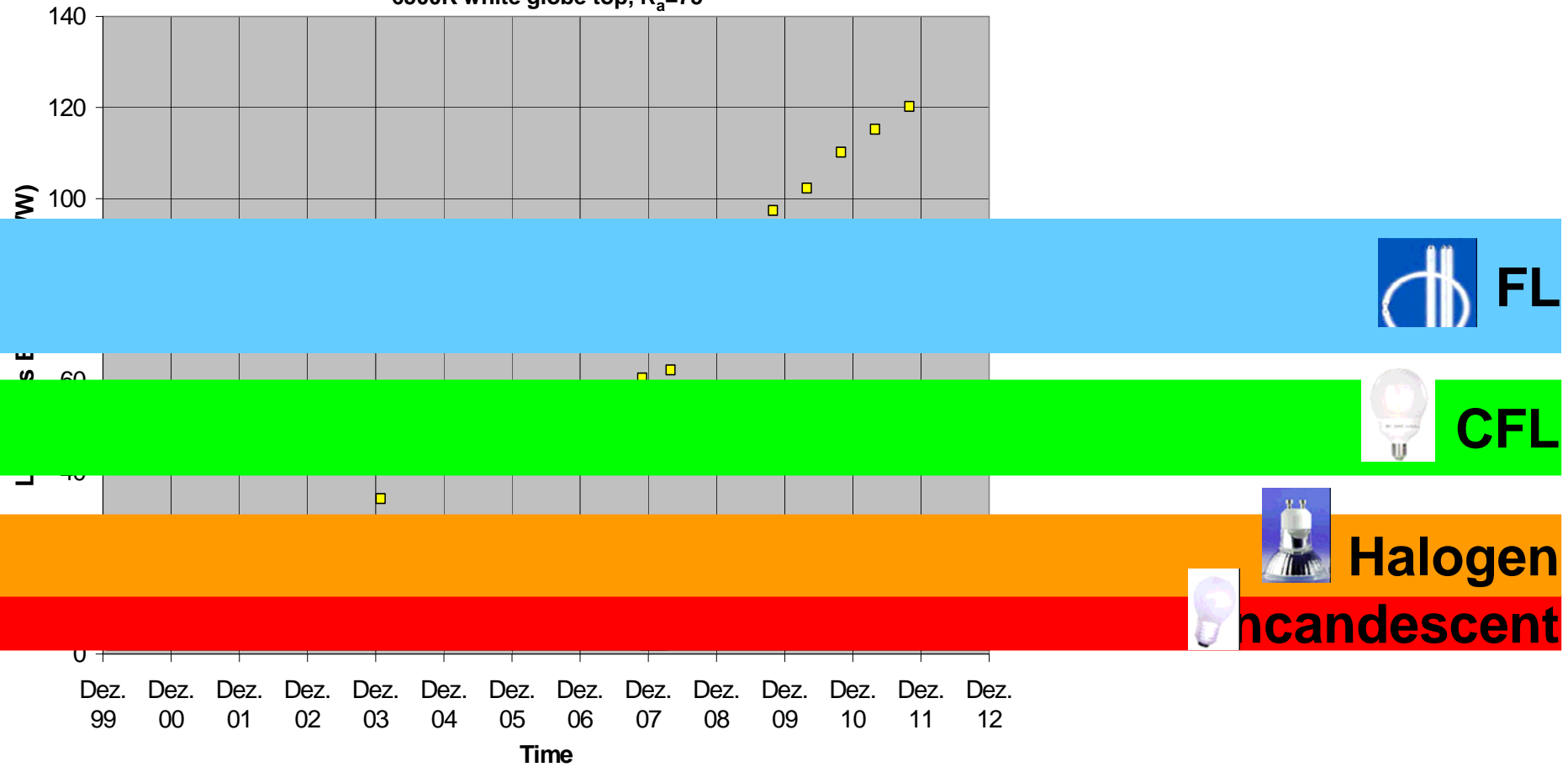
- Leading for „High-Brightness-Products“
- Leading in lm/W



# Roadmap Zumtobel LED High Power

1mm<sup>2</sup> chip, 350mA, RT, T<sub>c</sub>=40°C, steady-state operation, Globe Top

6500K white globe top, R<sub>a</sub>=75



# TA Optoelectronics, Lexedis and Ledon were the LED pioneers

## Starting the growth of the LED Business

### LEXEDIS

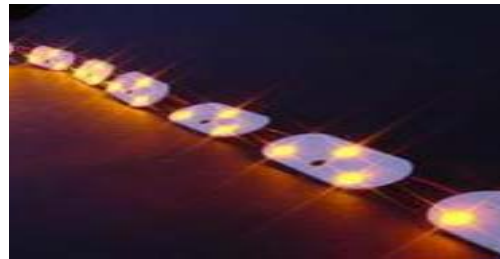
Development, production and sales of LED light sources



- Founded in the summer of 2005
- JV between TridonicAtco and Toyoda Gosei
- Development and production of high-power white LED light sources
- Use of LED light sources for general lighting purposes, automotive and transportation

### TRIDONIC.ATCO

Development, production and sales of LED components



- Founded 2001 in Jennersdorf, Austria
- Research cooperation with the Johanneum Institute in Graz, Austria
- LED modules and controls
- European market leader for LEDs in sign lighting
- OEM supplier to luminaire manufacturers all over the world

### LEDON

Development, production and sales of LED luminaires and lighting solutions

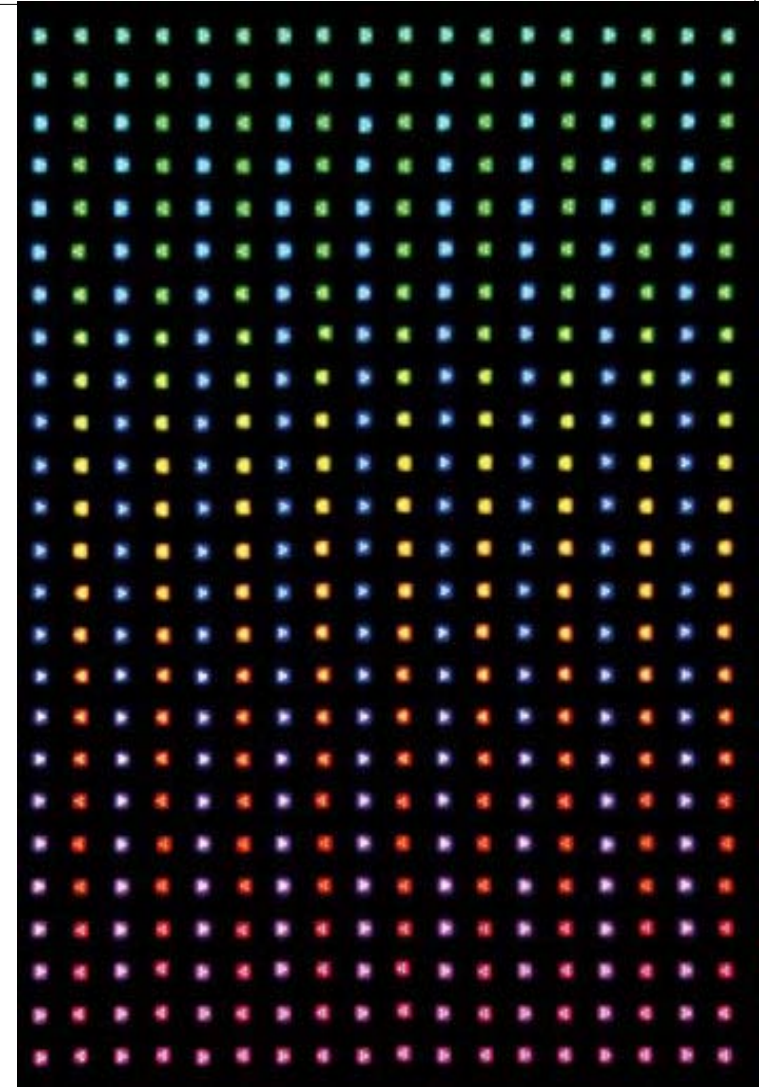


- Founded in December 2005
- Specialist in applications for innovative lighting solutions based on LED technology
- Target group: general lighting industry and new fields of application
- Jan 2007: Takeover of business activities of my-tronic GmbH, Germany

# Zumtobel LED Division

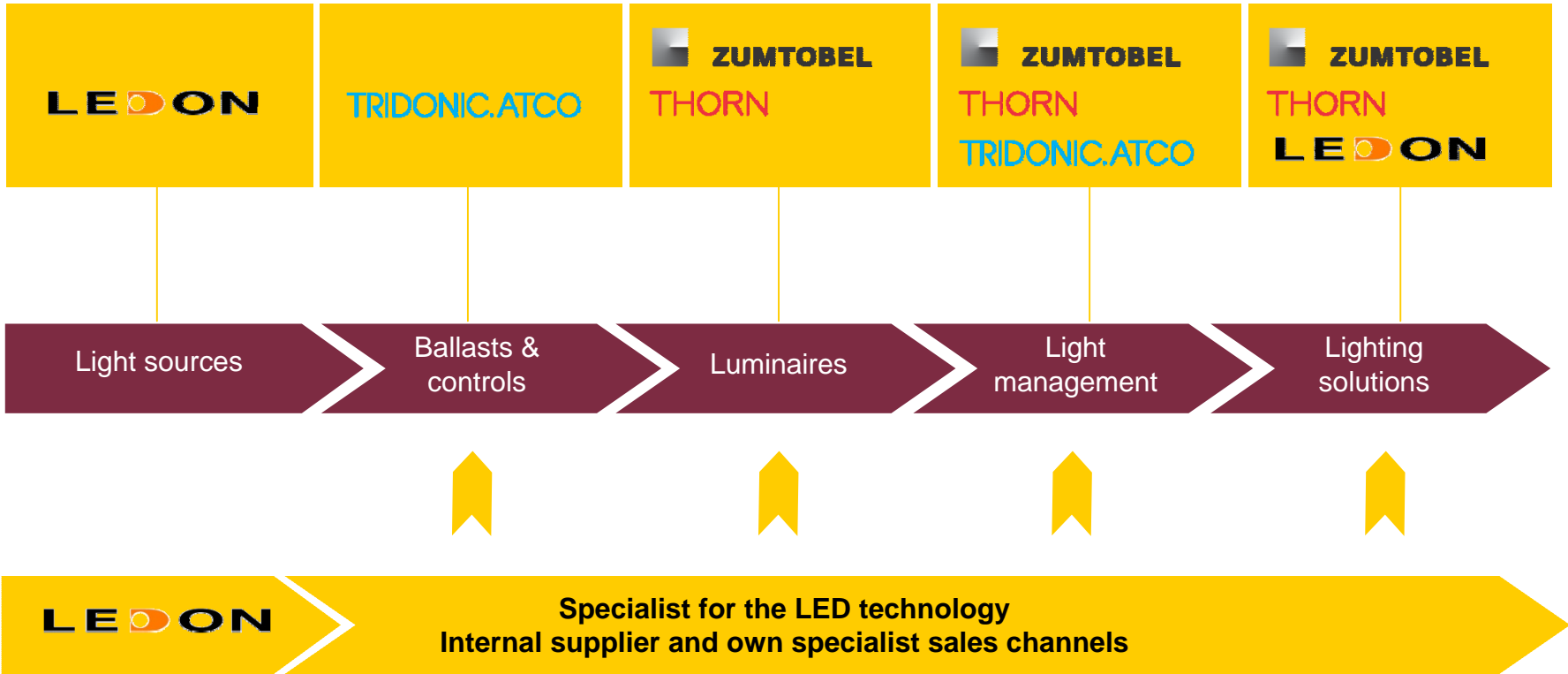
## Continue the growth of the LED business

- **Advantages of the LED start-up companies**
  - Highly specialized companies enabled fast initial growth
  - No limitations due to organization issues and fast decision making processes
- **Limitations of the LED start-up companies**
  - Limited alignment of strategy and operations
  - Difficulties for continuing growth (qualitative und quantitative aspects)
- **Zumtobel LED Division is the enabler for continuing a fast and comprehensive growth of the LED business**
  - Focused on the development of the LED know how (incl. OLED)
  - Make best use of the existing sales channels
  - Develop and serve new LED market potentials under the brand LEDON
  - Realization of synergies within the Zumtobel Group
  - Generate IPR in selected fields



# LED Division covers the complete value chain of lighting

Holistic approach in the field of professional lighting



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# LED Applications

## Products for illumination

### TALEXEngine EM-AP

- Anti-Panic or Escape-Route version
- Multiple fixing options
- Integral indicator LED



### TALEXstrip ES

- Low power consumption
- Easy mounting
- High light output



### Light Engine for Downlights

- >1000 lm / CRI >75 / 3000K\*
- Spot and Downlight App's
- Small Size, round (d=51mm)
- Small optics for precise light distribution



\* Preliminary data

# LED Applications

## Retail and Shop

### LED for Showcases/Vitrines

- Small size
- No UV or IR radiation
- Low heat dissipation
- Adjustable Colour Temperature
- Various shapes for different lighting effects



### LED for commercial refrigeration

- Energy efficiency
- Flexible shelf lighting
- Adjustable lighting spectrum
- No mercury, no glass



# LED Applications

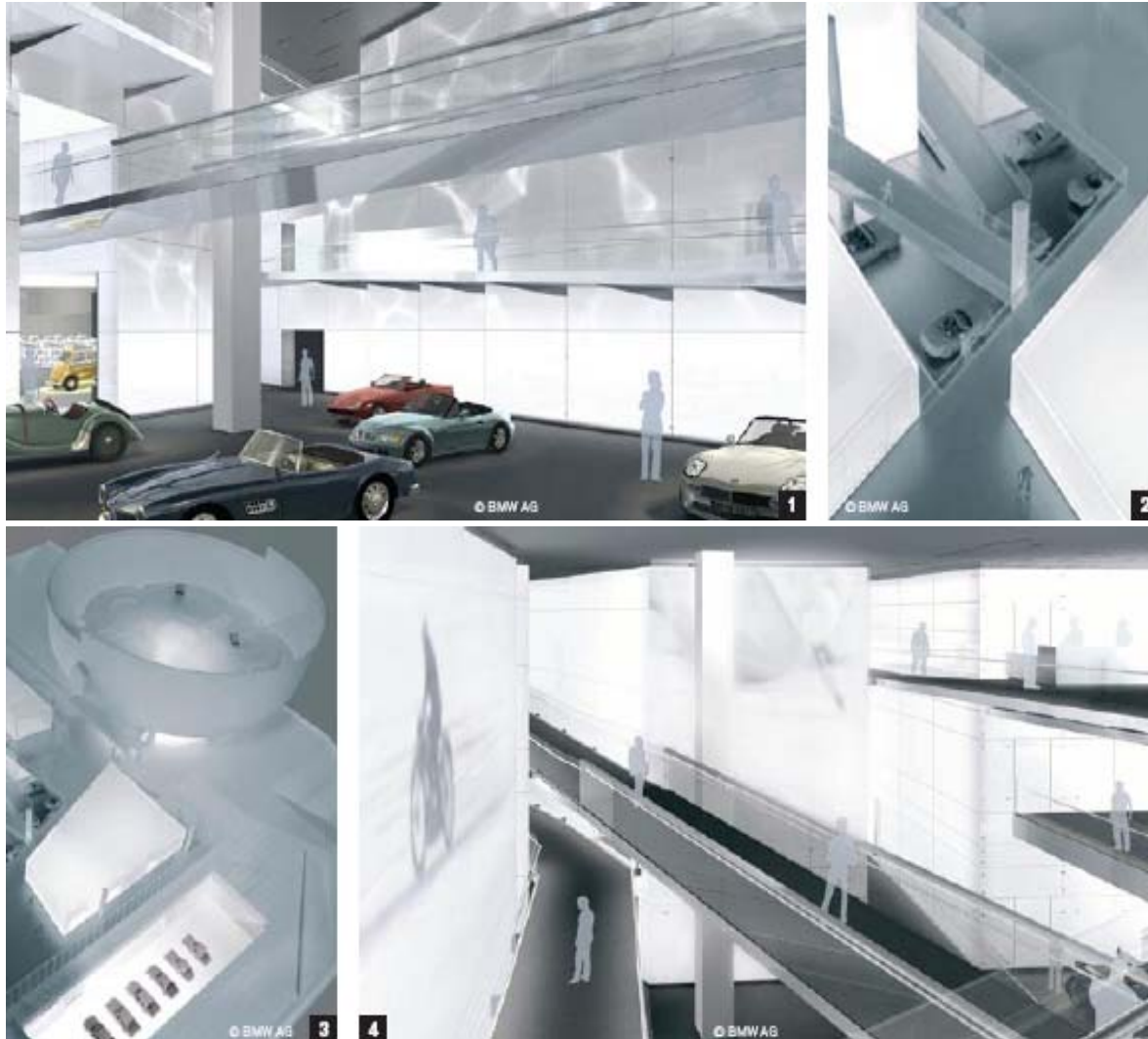
## Stadion Center, Vienna



- **Stadion Center, Vienna, Austria**  
21,000 m<sup>2</sup> retail space  
2,000 m<sup>2</sup> gastronomy  
70 shops
- **November 2006 – August 2007**
- **Investor: IG Immobilien Management GmbH**
- **Architects: Loistl & Loistl Projektconsult GmbH**
- **Design themes: Dr. Christian Mikunda, CommEnt**
- **Lighting design: Jürgen Hassler, Make it Real GmbH**

# LED Applications

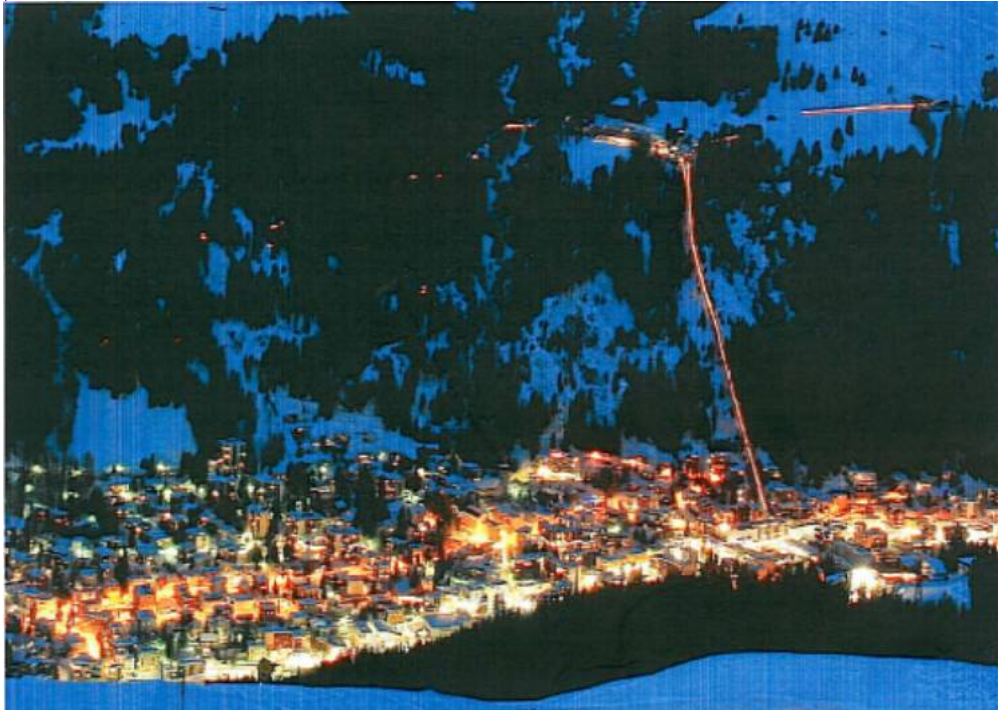
## BMW Museum, Munich



- **Location:** BMW Museum, Munich, Germany
- **Architect:** Atelier Brückner, Stuttgart
- **Lighting Planner:** Delux AG, Zurich
- **Application:** 3000 m<sup>2</sup> LED illumination of a glass façade
- **Competence:**
  - Optimum uniformity
  - Appropriate colour temperature corresponding to the building's media concept
  - Flexible use of LED sections
  - Energy efficiency, ease-of-use and maintenance-free
  - Advanced white light quality

# LED Applications

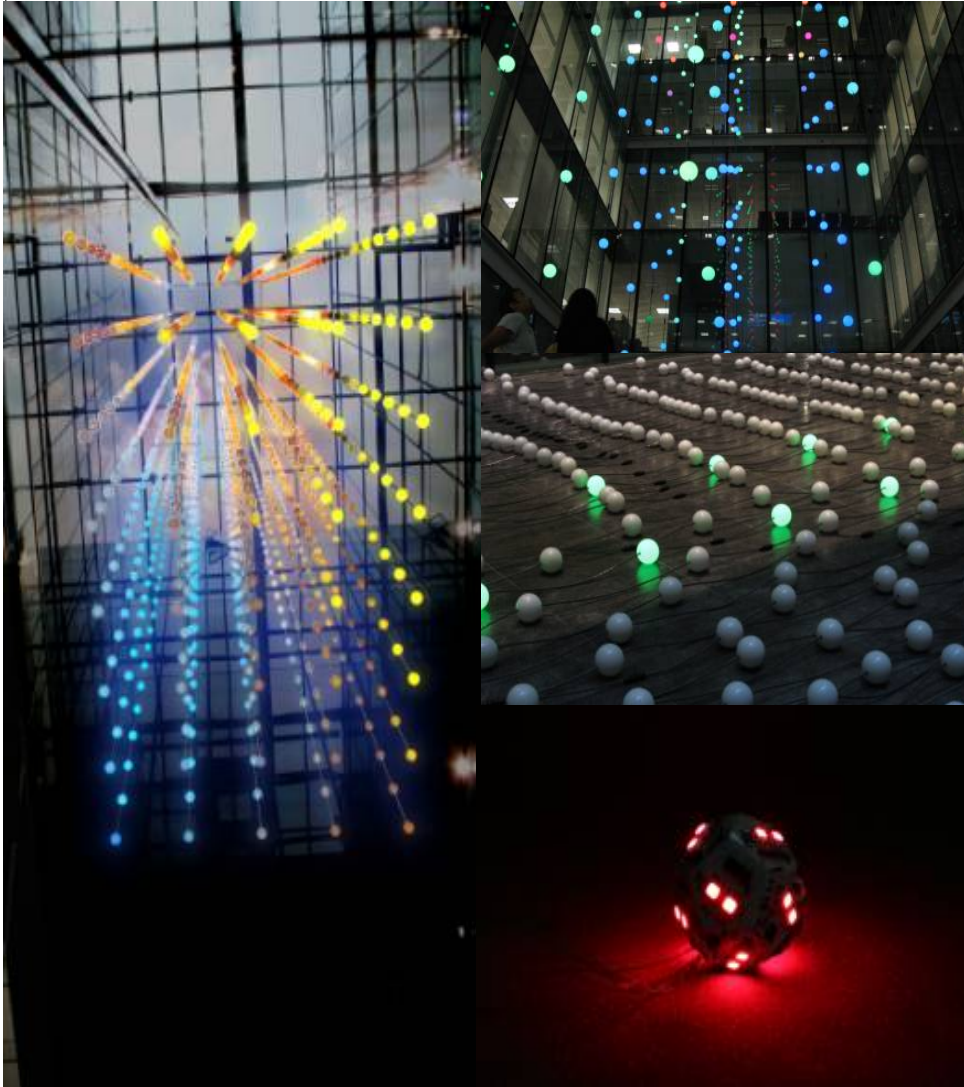
## Cable Railway / Schatzalp Davos



- **Location:** Schatzalpbahn funicular, Davos, CH
- **Client:** Pius App, Erich Schmid (owner)
- **Lighting Planner:** Ledon Lighting GmbH
- **Application:**
  - Lighting solution involving LED light tubes
  - 280 tubes, each 2.6 m long
  - 8 separately controlled segments per tube
  - Fitted onto handrail of side rail
- **Competence:**
  - Overall solution including development, production, wiring, control system and programming
  - Plug&play package for quick and easy installation
  - Spectacular linear lighting scenario with richly varying lighting atmospheres
  - Individual, customised adjustment of colour effects

# LED Applications

## Pixel Cloud



- **Location:** BishopsSquare, London, GB
- **Architect:** Foster & Partners, London
- **Design:** Jason Bruges Studio, London
- **Development & Production:** LEDON Lighting
- **Application:**
  - Lighting solution by Pixel Cloud
  - Matrix composed of 624 globes
  - Each fitted with 24 LEDs on 12 faces
  - Individually controllable with 8-bit resolution in red, green and blue
- **Competence:**
  - Spectacular lighting solution
  - Diverse range of lighting moods and appearances
  - Lighting scene and software can be adopted to meet customer
  - Individual, customised adjustment of colour effects

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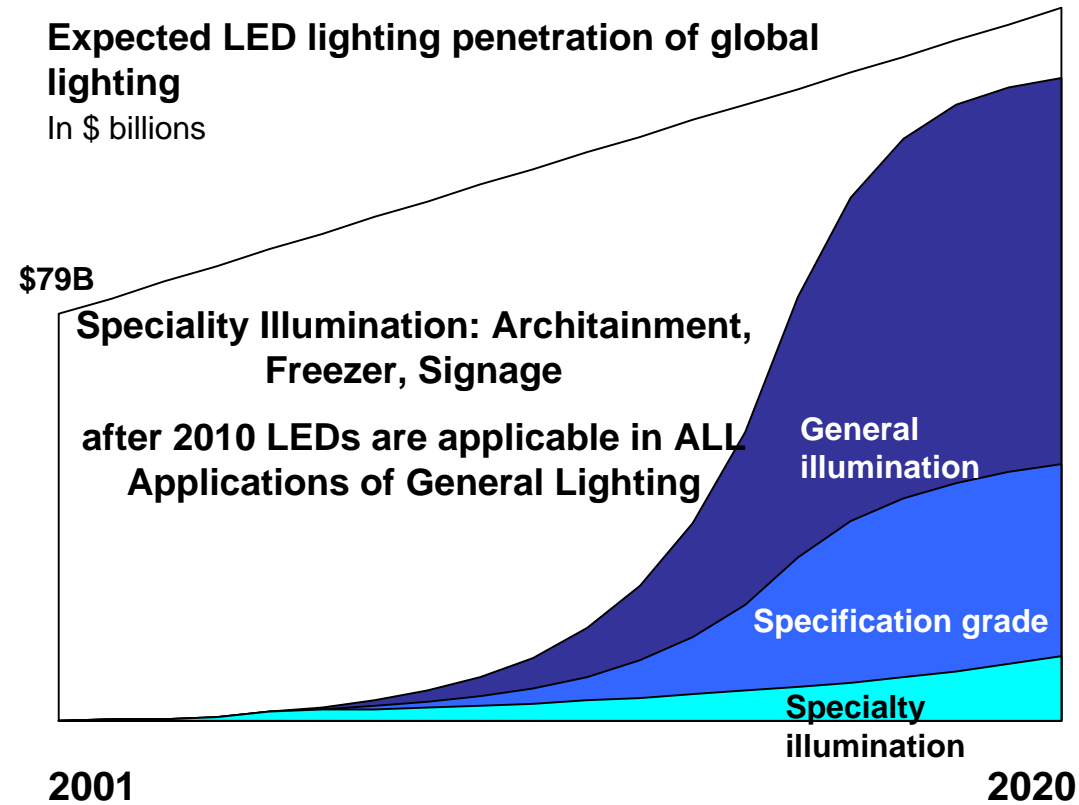
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## Zumtobel Group Strength:

- 2000 people at the customer base
- Best Application Know How
- Unique Sales Channels
- No need to protect „lamp“ business
- Vertical integrated value chain
  - Unique Position in LED-Dice
  - Leading in COB
  - Competences in all Key Technologies

→ Zumtobel LED Division will support at its best





**Thank you for your kind attention**