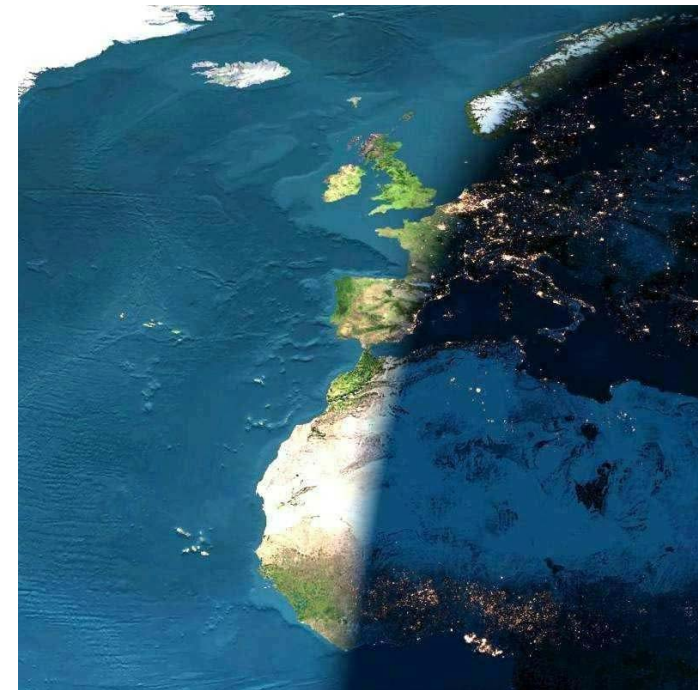


## Smarter lighting – European perspective



Nils Erkamp

Business Line Manager Lighting

TNO (Netherlands Organization for Applied Scientific Research)

[nils.erkamp@tno.nl](mailto:nil.erkamp@tno.nl)

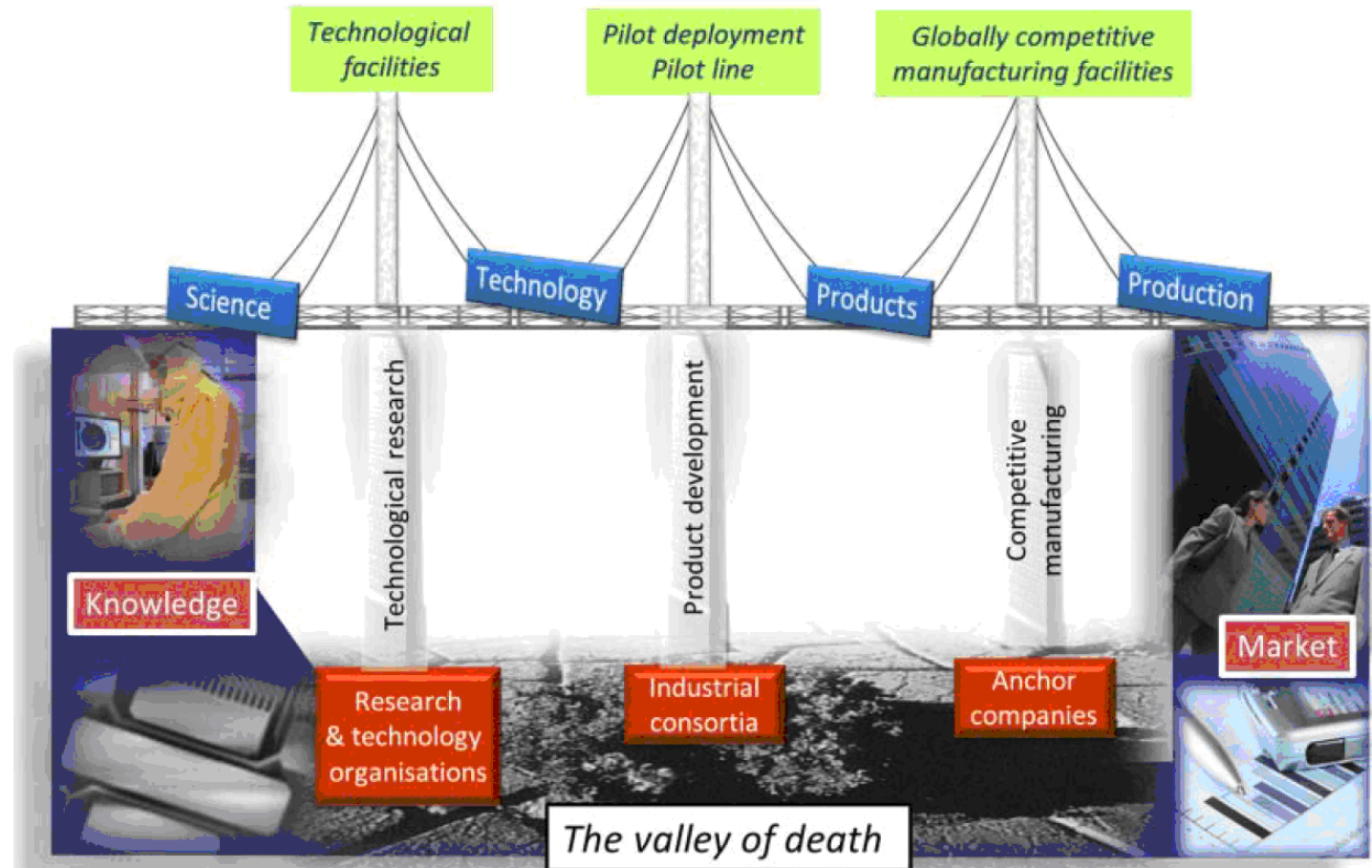
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# Smarter lighting – European perspective

- › The European Union perspective
- › Smart lighting options
- › Why smart lighting makes business sense
- › The innovation challenge

# Europe is shifting focus

Old	R&D
New	Innovation-To-Market



# European objectives of Horizon 2020 program



# Lighting can contribute significantly to a number of societal challenges

## › EU Societal challenges

- › Health, demographic change and well-being
- › Secure, clean and efficient energy
- › Smart, green and integrated transport
- › Climate action, resource efficiency and raw materials
- › Inclusive, innovative and secure societies)
- › Food security, sustainable agriculture, marine and maritime research and the bio-economy



## Smarter lighting – European perspective

- › The European Union perspective

Smart lighting fits very well with European impact objectives

- › Smart lighting options

- › Why smart lighting makes business sense

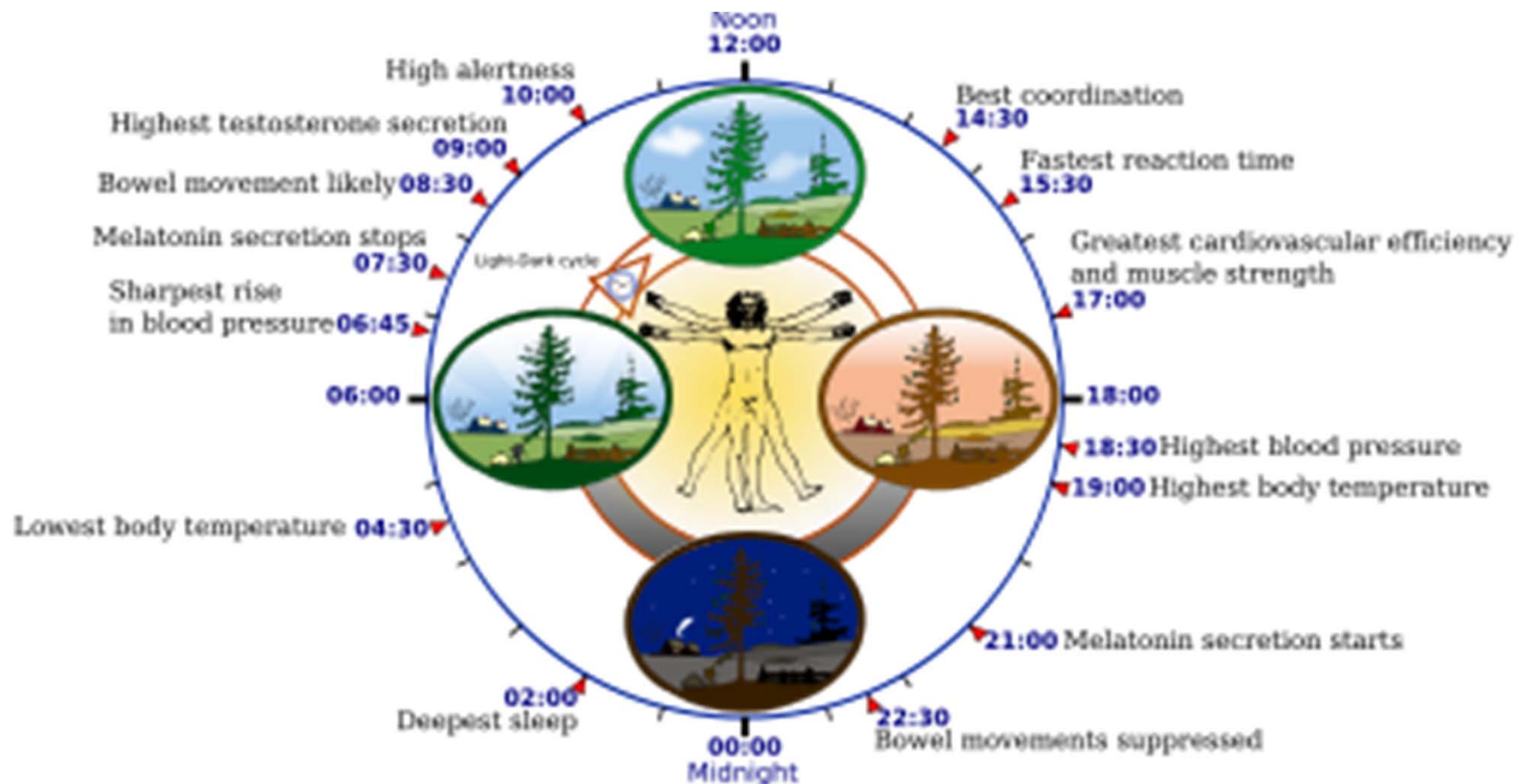
- › The innovation challenge

## Smart Lighting options

1. Lighting for Health & Well-being
2. Sustainability perspective: C2C
3. Smart solutions in buildings & cities

# Smart Lighting 1: Lighting for Health & well-being

- Strong indications of beneficial effects need to be **proven** and then translated in new **value propositions**





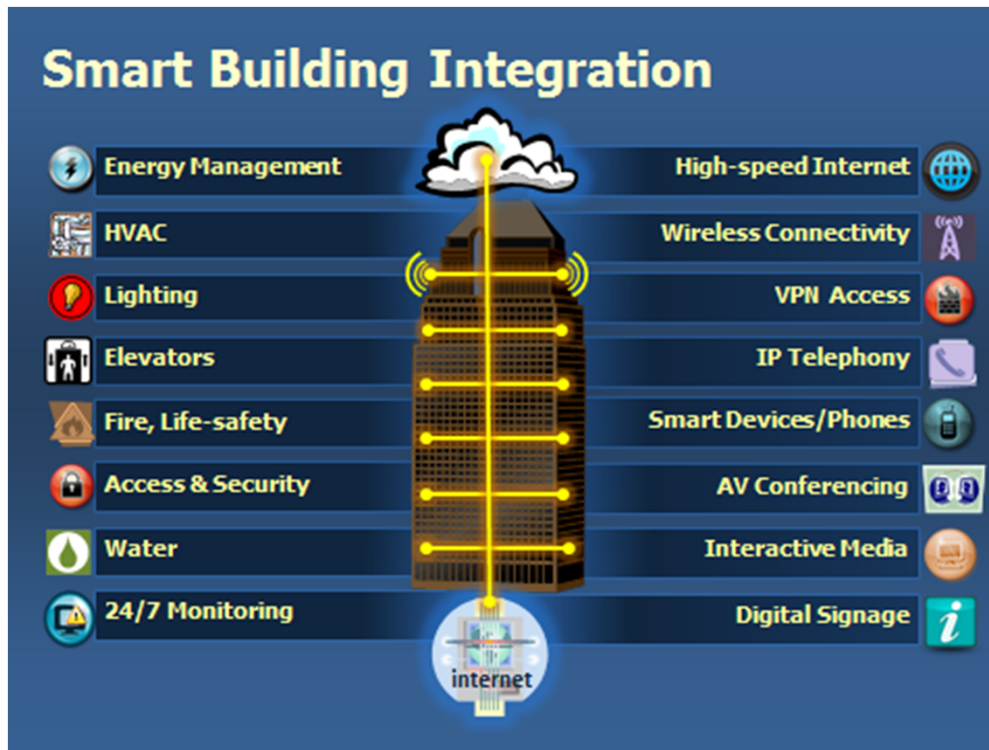
## Smart Lighting 2: Sustainability (C2C) perspective

- › This is more than dealing with (hazardous) waste
- › Example: Desso Airmaster is a **concept** that clears the air of dust particles with a **business model** where the product is returned after usage



# Smart Lighting 3: Smart solutions in buildings, cities

- Penetration of controls systems is very limited: need for **interoperable**, easy to use systems
- Lighting units are ideal roll-out platform for **sensor networks** that can enable new services



## Smarter lighting – European perspective

### › The European Union perspective

Smart lighting fits very well with European impact objectives

### › Smart lighting options

Smart lighting offers great opportunities for new value creation

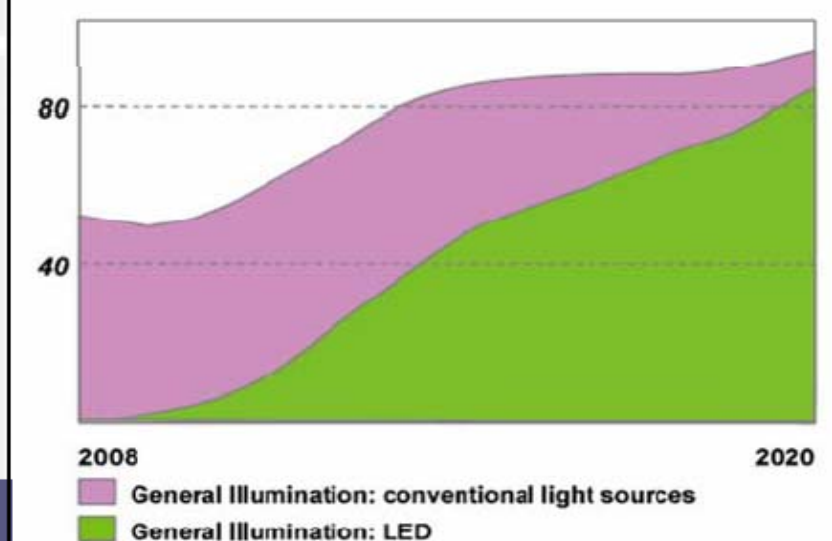
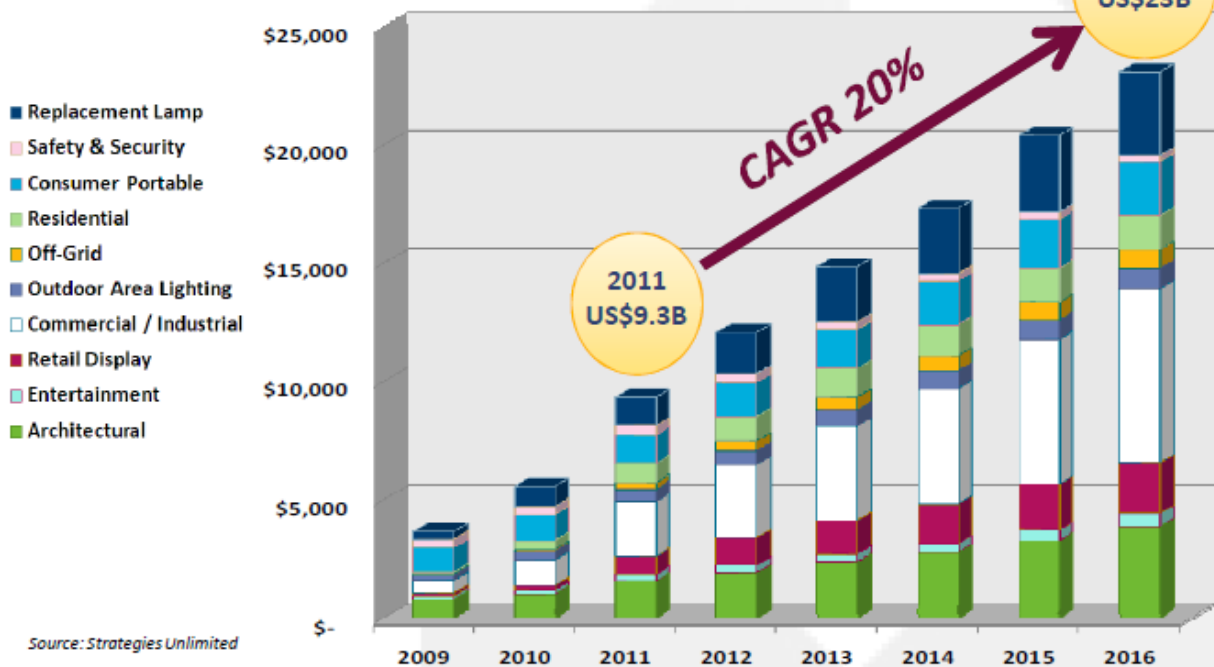
### › Why smart lighting makes business sense

### › The innovation challenge

# Why smart lighting makes business sense

➤ For Solid State Lighting the sky seemed the limit ...

## Solid State Lighting Market 2009-16



... which was driven by dramatic cost and efficiency improvement.

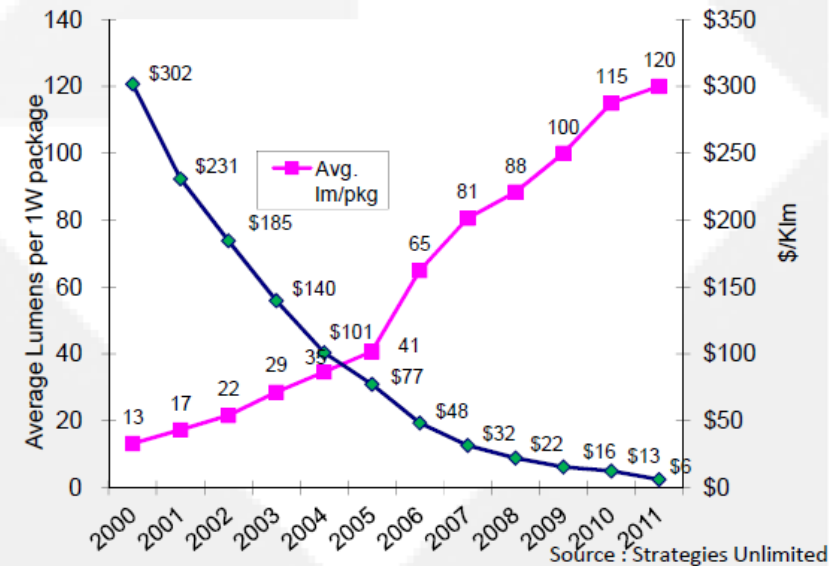
- › Today:
  - › < 4 \$/klm
  - › > 150 lm/W
  
- › 2020 DOE:
  - › 0.7 \$/klm
  - › 230 lm/W

## Technology -Efficiency/Cost

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

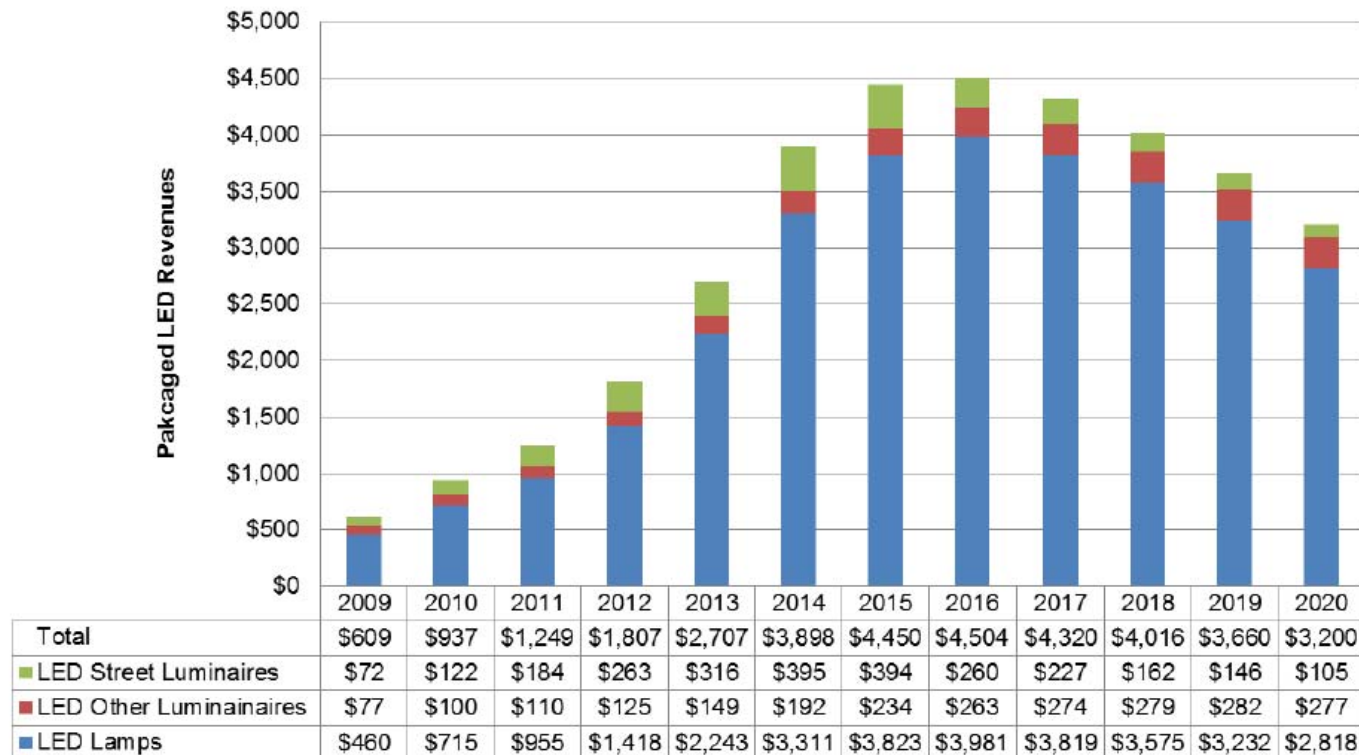
Large volume LED chip manufacturing and packaging capacity came on line in China and Korea for backlight market

- excess capacity
- decline in prices --on an average of 25% to 30%.



# We've started to realize that there is a limit to growth ...

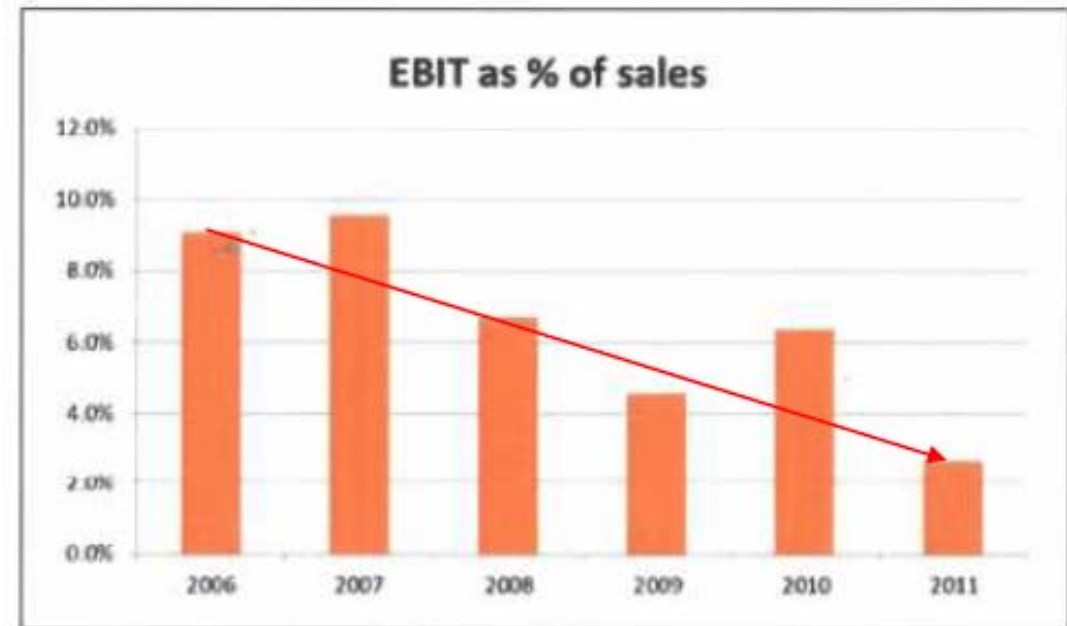
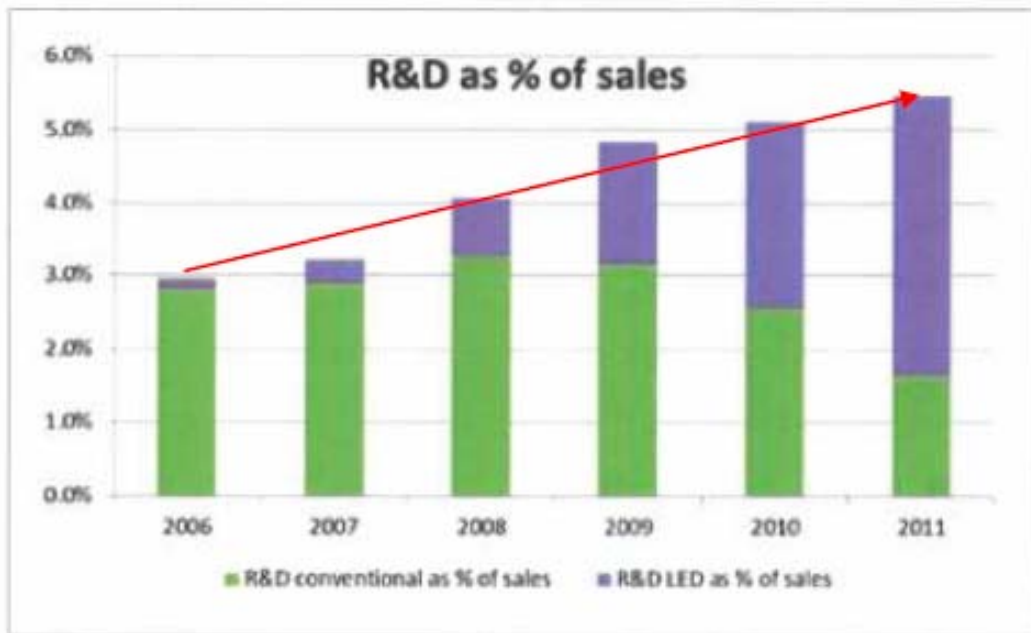
- › In volume due to shrinking lamp replacement market
- › In money due to price erosion





## But is this creating value ?

- ▶ Mr. Klaus Vambersky (CTO Zumtobel group) @ Smart Lighting 2013 conference:



## An industry on the treadmill

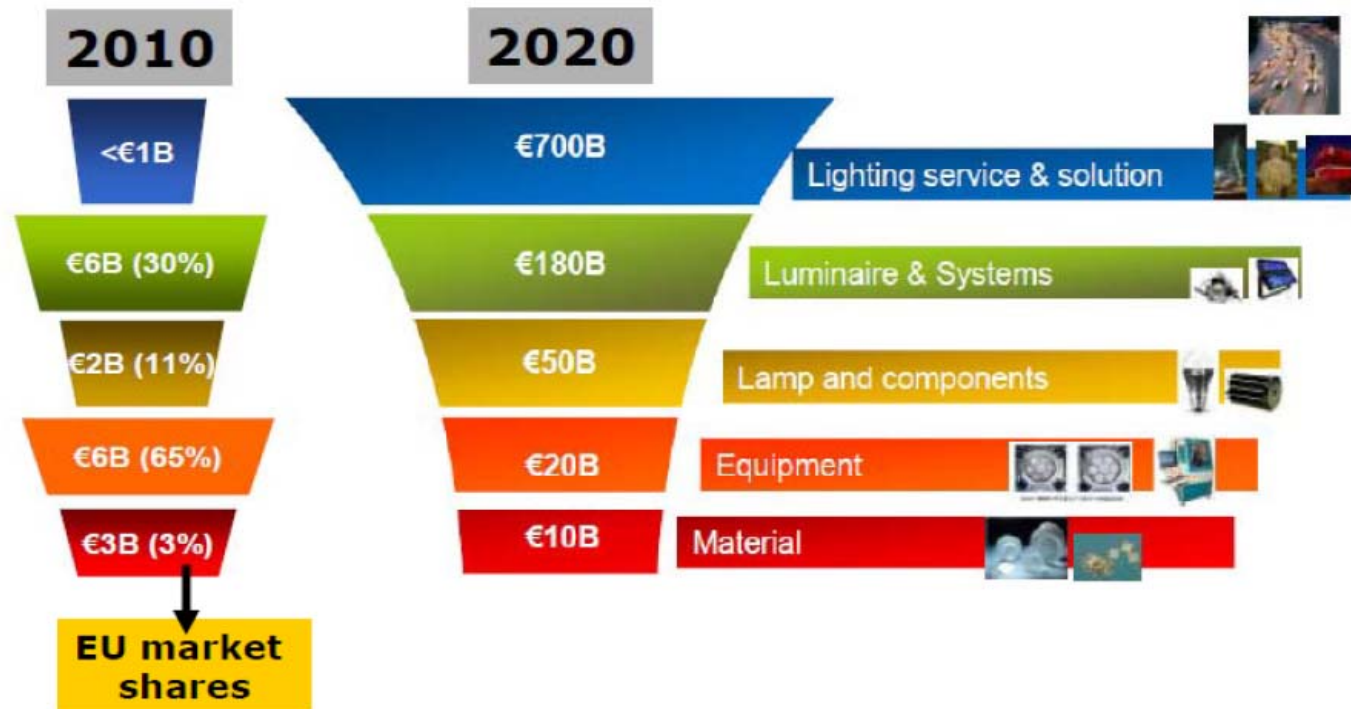
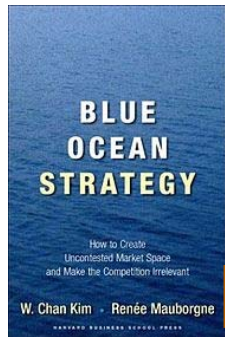
- › Profitability is decreasing
- › Cash is needed to finance growth
- › Shareholders have to be patient ...



# An alternative: Smart Lighting to create new value in services and solutions



## Solid-State Lighting Global Markets



## Smarter lighting – European perspective

### › The European Union perspective

Smart lighting fits very well with European impact objectives

### › Smart lighting options

Smart lighting offers great opportunities for new value creation

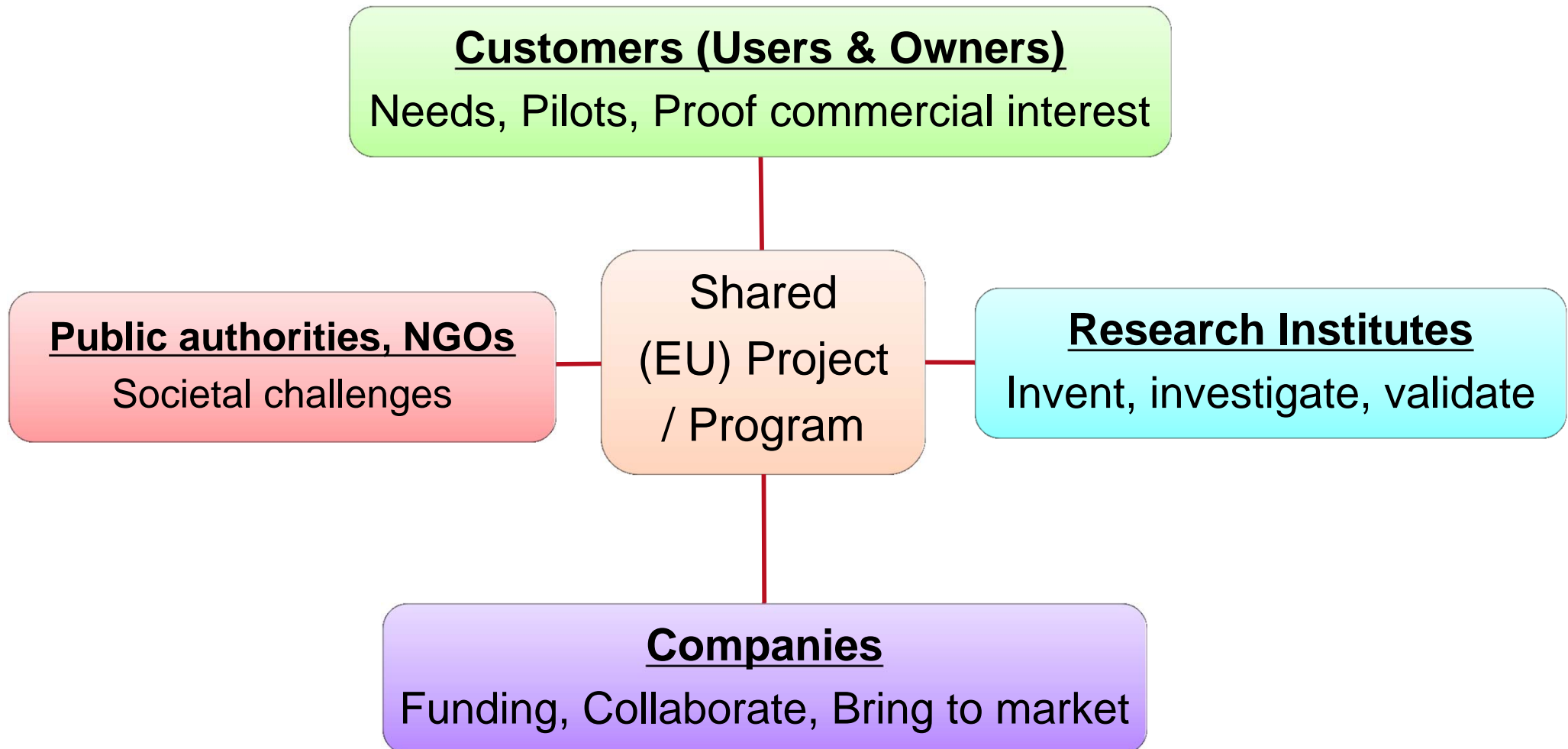
### › Why smart lighting makes business sense

While the general lighting mainstream is experiencing serious financial pressures, new value creation is possible in smart lighting

### › The innovation challenge

# The innovation challenge

## Collaboration between stakeholders is smarter



## Conclusion

### › The European Union perspective

Smart lighting fits very well with European impact objectives

### › Smart lighting options

Smart lighting offers great opportunities for new value creation in e.g. health & well-being, sustainability and smart cities

### › Why smart lighting makes business sense

While the general lighting mainstream is experiencing serious financial pressures, new value creation is possible in smart lighting

### › The innovation challenge

Cooperation of companies and stakeholders is the smarter way to harvest the benefits of smart lighting



**TNO** innovation  
for life