#### **PHILIPS**

### Lighting

# The LED lighting revolution

Stimulating socio-economic progress in the 21st century – December 2015



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Huge savingsdespite growingdemand for energy

- Three global trends are at play that put constraints on resource challenges
  - Population growth
  - Urbanization
  - · Rise of the middle class
- By 2030 these global trends will have led to an estimated 35% increase in number of lightpoints worldwide.
   By accelerating renovation of the installed base and leapfrogging to efficient and connected LED lighting solutions for new cities and buildings enormous energy savings can be achieved



# From a lineair to circular economy

- Over the past decades we have optimized a society focused on (paying the) lowest initial cost. This has resulted in a linear society, which extracts, consumes and emits huge amounts of resources (energy, material, food and water). The creation of this linear economy has been supported by using GDP as the 'perfect' linear indicator for progress.
  - To successfully address sustainable development challenges (now captured in the 17 Sustainable Development Goals) we need to move to smarter circular ways and models of managing resources and creating progress and prosperity, we need to become a circular society with quality of life as the key indicator.
    - In this society, effective use and re-use of resources starting with energy will create a competitive economy centered on the health and well-being of everyone.

## Global trends 35% increase in lightpoints compared to 2006

Due to population growth, increasing urbanization and the rise of the middle class, the total number of lightpoints throughout the world will have **grown by 35%** by 2030.





### Meeting increased demand **for lighting**

With the projected 35% growth in lightpoints, the world needs solutions that take into account the well-being of both people and planet. That means:

- The world needs More lighting to cope with increased demand
- The world needs Energy-efficient lighting to reduce the economic and environmental impacts
- The world needs Smart, connected lighting to maximize the benefits

### **LED lighting** provides a viable solution

Four drivers for change



#### 1 value proposition

 LED lighting can now be used in all applications. It can also be connected to lighting management systems and adjusted to produce new lighting experiences. This makes it an energy-efficient lighting solution that can help drive global sustainable development. Lighting currently consumes **19%** of the world's electricity.



# **LED lighting** energy savings potential

Despite the enormous growth in lightpoints by 2030, compared to 2006, LED lighting can deliver:

Region	€ bio	Carbon mt	# Power Plant
Global	272	1400	1250
EU (incl. RCA)	85	198	267
NA	48	301	273
Latam	24	34	94
Asia	71	601	403
Middle East & Africa	42	266	212





A decline of 1400 million

tons in carbon emissions

### € 272 billion

in energy savings compared to 'business as usual' A saving of **1250** power plants compared to 'business as usual' **Benefits** beyond Lighting

As well as energy efficiency, cost savings and reduced carbon emissions, LED lighting provides additional benefits beyond efficiency. With lighting levels that can be adjusted and no compromise in light quality, it can be used to create:

More patient-friendly

hospitals

• Safer roads and streets More productive
 offices

• More liveable cities and attractive public spaces

Barriers to switch

#### Lack of awareness

 people are simply not sufficiently aware of the many benefits of good quality LED lighting.

- $\cdot$  Lighting is of low interest
- People don't see the electricity costs associated with lighting
- They are unaware of new, energyefficient lighting technologies
- Often decision makers are not lighting experts

#### Financial

Although energy-efficient lighting technologies cost a little more initially, they offer attractive levels of payback and save large amounts of both energy and money during their lifetime.



# Next steps to **acceleration**

 Technology exists: there's no need to delay adoption

- Policy frameworks: renovation of existing lighting systems combined with green public procurement
- Financing: unleash public private financing mechanisms
- Communicate tangible benefits: impacting voting and buying behavior

Over the years, the use of conventional light bulbs has been steadily decreasing as people become more and more aware of the disadvantages.

### Conventional versus...

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In 2006 the annual global sales of incandescent light bulbs was at a stable level of **12 billion** pieces per year. The collective efforts to transition towards efficient lighting have already resulted in a halving of the annual market for incandescent light bulbs to **6 billion pieces**.

## ...LED lighting

In the years ahead of us we will see the 19th century
 incandescent light bulb (the first mass electric appliance!)
 completely disappearing, and being replaced by 21st century
 efficient connected LED lighting systems and solutions.



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### The broader economic benefits of energy efficieny

Global trends (population growth, urbanization, rise of the middle class) lead to an annual growth in energy demand of 3%, while as a society we only become close to 1.5% more efficient per year. If we double the rate of energy efficiency improvement to 3% per year this has significant economic benefits:

# Doubling the rate of energy improvement provides

• €2300 / US\$ 2500 billion reduction in annual fuel bill by 2030

• **reduction** of household energy bills by one third

• More than 6 million jobs (already by 2020)

From "The 2015 Energy Productivity and Economic Prosperity Index", 'How efficiency will drive growth, create jobs and spread wellbeing throughout society'; Ecofys, The Lisbon Council, Quintel, 2015



# The benefits of LED lighting are ripe for the taking

You can make significant progress in saving energy, reducing carbon emissions and cutting costs by switching to LED lighting. By connecting LED lighting to smart controls, networks, devices and apps, Philips enables new levels of energy efficiency, amazing lighting experiences and outstanding business outcomes. To fully realize the potential, accelerated renovation of urban infrastructure and buildings is needed. Cities, states and regions can take the lead by partnering with progressive companies. Energy efficiency and connected LED lighting systems and solutions are fruits lying on the ground waiting to be picked up. Philips looks forward to working with you on your lighting projects.

## The LED and Digital Revolution

Technology and business model transition



Leading EE lighting Solutions

Connected LED lighting integrated in infrastructure Eco-systems

#### Offering Lighting Products

- Analog Lamps
- Stand-alone 'Dumb'
- Products Replacement sales
- Digital LEDs
  - Connected 'Smart'
- Systems & Services Projects



#### Transition from analog to digital:

• Switch from lighting replacement products to financing and leasing lighting as a service

This will reap not only the direct economic benefits of lighting but also the benefits beyond lighting fully in line with the transition from a linear to a circular society.



### **Real life Madrid case**

Madrid is advancing its city infrastructure by swapping 100% of its street-lighting with Philips LED and other Philips energy-efficient lighting solutions. This street-lighting renovation project is the largest in the world to date. This renewal project delivers a 50% saving in energy.

### Total

Metric	Global	Europe	NA	Latam	Asia	MET
EUR bn	272	85	49	24	71	42
M Co2	1401	198	301	34	601	266
Stations	1250	268	273	94	403	212



### **Home Lighting**

Metric	Global	Europe	NA	Latam	Asia	MET
EUR bn	82	27	18	3	20	14
M Co2	437	65	116	4	166	86
Stations	384	87	105	12	111	69



### **Outdoor Lighting**

Metric	Global	Europe	NA		
EUR bn	21	6			
M Co2	109	16	22		
Stations	101	22	19		



## **Office Lighting**

#### LED savings potential per region

Metric	Global	Europe	NA	Latam	Asia	MET
EUR bn	49	15	6		14	
M Co2	245	32	40	9	110	55
Stations	221	44	36	23	74	44



## **Retail Lighting**

Metric	Global	Europe	NA	Latam	Asia	MET
EUR bn	34	9	6	7	8	4
M Co2	158	20	41	9	68	21
Stations	150	27	37	23	45	17



## **Hospitality Lighting**

Metric	Global	Europe	NA	Latam	Asia	MET
EUR bn	15	6	2	0	4	
M Co2	80	12	10			
Stations	70	16	9		26	



## **Health Lighting**

Metric	Global	Europe	NA	Latam	Asia	MET
EUR bn	12	5	1	0		
M Co2	60	14	7	0	25	
Stations	53	19	6	0	17	10



### Other

Metric	Global	Europe	NA	Latam	Asia	MET
EUR bn	58	17	11	7	17	7
M Co2	312	38	65	7	149	52
Stations	272	52	59	20	100	42



### Potential business enablers; overcoming the investment hurdle

#### Use new business models

- Utility funding schemes
- Public Private Partnership
- Energy Service Company

#### **Private financing**

- Installment payment
- Bank loan
- Financial lease

#### **Fiscal measures**

- VAT differentiation
- Import duties
- Tax deduction

**Public Funding** 

Economic stimulus

#### **Carbon financing**

- Clean Development Mechanism
- Joint Implementation
- Carbon credits
- White certificates

## Policy measures; (supply' and 'demand')

Restrict SUPPLY of least efficient products

Stimulate DEMAND of most efficient products and systems

#### Phase out old inefficient technologies by setting minimum efficiency and quality requirements

- Incandescent lamps
- Halophosphate TL lamps
- High Pressure Mercury lamps
- EM ballasts for fluorescent lighting

National policies and legislation promoting efficient products and systems

- Green Public Procurement
- Lighting System Legislation
- Financing mechanisms
- Energy performance targets for all buildings and neighbourhoods, combined with renovation of existing ones



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