



# Energy efficient lighting

A summary of "Green Switch" facts - December 2008

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**PHILIPS**

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## I. What is the issue? - Background facts and figures, global energy and climate change

- Lighting consumes a significant part, 19% of all electricity in the world (source IEA).

### Four Key issues

- Rising energy prices
- Climate change
- Security of energy supply
- Economic growth

Lighting 19 %


















Other electricity  
uses 81 %

### Energy efficient lighting

Energy efficient lighting solutions help in tackling the global energy and climate change challenge.

## Energy efficient lighting solutions

For each market segment an energy efficient lighting solution exists already today.  
On average a 40% saving is possible.

Area of lighting		Energy savings		CO <sub>2</sub> savings per lamp per year*	Euro savings per lamp per year**
Office and Industry	T8 	61% 		TL5	93 kg CO <sub>2</sub> €19
Retail	Halo 	80% 		CDM	140 kg CO <sub>2</sub> €28
Hospitality	Incandescent 	61% 		MASTER LED	102 kg CO <sub>2</sub> €20
Street	HPL 	80% 		CosmoPolis	132 kg CO <sub>2</sub> €26
Homes	Incandescent 	80% 		CFLi	41 kg CO <sub>2</sub> €8

\* Based on 0.51 kg / CO<sub>2</sub> kWh \*\* €0.10/kWh

## What is the issue? - More background facts and figures

- There has been a revolution in lighting technology during the past 10-15 years. Switching the older lighting to the **latest technology** will bring **huge savings** in energy costs and CO<sub>2</sub> emissions.
- Approximately **2/3** of all lighting currently installed in the world is based **on older, less energy efficient technology** (developed before 1970).
- The **current changeover rate** to new lighting technologies is simply **too slow**:  
e.g. Street lighting 3% per year, Office lighting 7% per year.

## 2. Energy efficient lighting savings potential - Facts and figures General lighting

Saving potential	Global	Europe	North America	Latin America incl. Mexico	Asia Pacific	Middle East and Africa
EUR billion	120	27	38	9	33	13
Million tonnes CO <sub>2</sub>	630	99	203	24	216	88
Million Barrels of Oil Equivalent	1800	405	575	136	486	198
# Power stations @ 2TWh/yr	600	135	192	45	162	66

## General lighting can save up to average 40% - Facts and figures General lighting

An achievable **average energy saving of 40%** on all the lighting currently installed globally would save:

- **EUR 120 billion in energy costs**

- **This equates to:**



630 million tonnes of CO<sub>2</sub>



1,800 million Barrels of Oil Equivalent

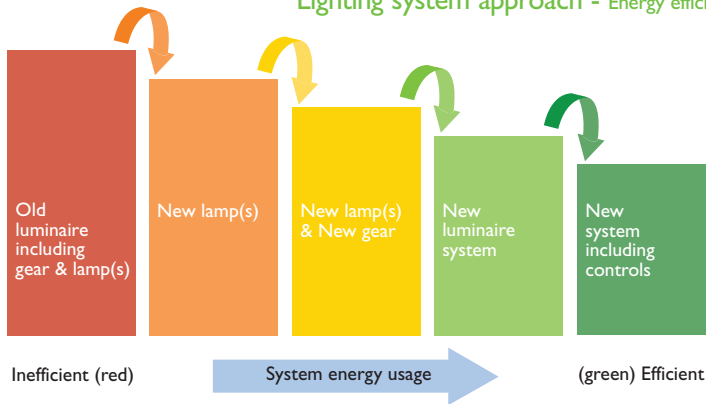


Annual output of 600 medium sized power stations @ 2TWh/yr





## Lighting system approach - Energy efficiency improvement



- Lighting systems can be improved to become more energy efficient.
- The maximum effect is realized through new systems including controls.

## Saving potential Building lighting -

Facts and figures Office and Industry, Retail and Hospitality

Saving potential	Global	Europe	North America	Latin America incl. Mexico	Asia Pacific	Middle East and Africa
EUR billion	62	14	18	5	18	7
Million tonnes CO <sub>2</sub>	330	50	100	12	119	49
Million Barrels of Oil Equivalent	936	204	285	69	270	108
# Power stations @ 2TWh/yr	312	68	95	23	90	36

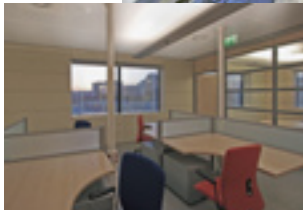
## Building lighting can save up to 70% - Facts and figures Office and Industry, Retail and Hospitality

- Public and commercial buildings represent 60% of global lighting electricity usage.
- Up to 80% of office lighting is based on outdated and energy inefficient lighting systems.
- On average only 1% of office lighting uses lighting controls (daylight adaption / presence detection).
- Individual project savings of 60-70% in energy costs per year by switching from old to new office lighting.
- Additional benefits of energy efficient lighting: better light quality, lower mercury levels and smaller dimensions.

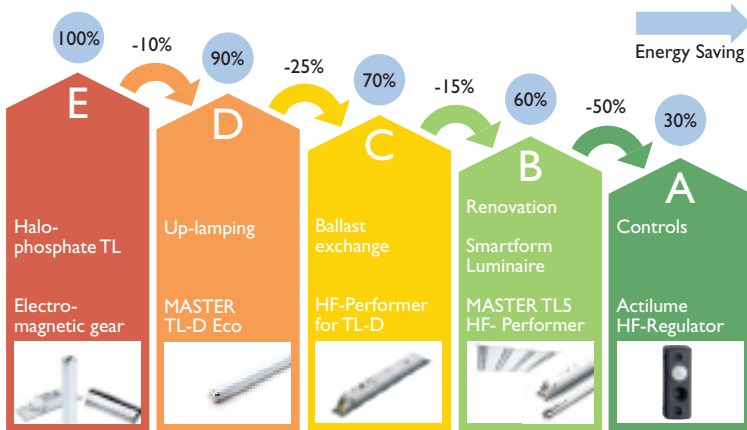
## Example project Office lighting - Public and Commercial area

### Portugal Telecom

- Green solutions and easy installation and operation.
- TL-5 luminaires with modern controls for daylight regulation and automatic lighting optimization.
- Compliant with local standards and directives.
- Energy saving of 40%.



# Office lighting system improvement



## Retail lighting - Facts and figures Retail

A global annual saving up to EUR 11 billion in energy costs can be achieved by switching from old to new lighting in retail.

Globally 5 billion square metres is in use by retail.

### Food

- Top 50 global super / hypermarkets: more than 60,000 stores
- 20%-30% of the energy bill is lighting related \*
- Energy saving solutions available are MASTER TL5, TL-D Eco, MASTERColour CDM and LED freezer lighting.

### Fashion

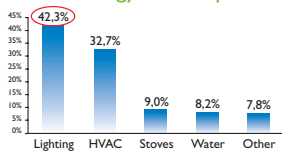
- Top 50 fashion chains and department: 100,000 stores.
- Energy saving alternatives like MASTERColour CDM also ensure the right level and quality of light.



## Hospitality lighting - Facts and figures Hospitality

- Approximately **1/3 of global hotel** rooms are still using energy inefficient products which use **4-5 times more energy** than the energy efficient alternatives.
- Global **saving EUR 6 billion** in energy costs per year by switching from old to new hospitality lighting technology.
- Energy efficient up-lamping can save up to **EUR 40** per year per hotel room\*.
- Luminaire(s) system renovation with lighting controls can bring **60-70% savings**.

### Hotels energy consumption



\* Including savings of the hotel's general area's

### Energy efficient lighting



## Saving potential Street lighting- Facts and figures Street

Saving potential	Global	Europe	North America	Latin America incl. Mexico	Asia Pacific	Middle East and Africa
EUR billion	12	3	4	1	3	1
Million tonnes CO <sub>2</sub>	61	11	20	3	18	9
Million Barrels of Oil Equivalent	179	45	55	16	42	21
# Power stations @ 2TWh/yr	60	15	19	5	14	7



## Street lighting can save up to 65% - Facts and figures Street

- Approximately **1/3** of global roads and motorways are still lit using cheap, **inefficient 1960's technology**: high pressure mercury lamps.
- Current changeover rate **3% per year** → it will take **30 years** to realize full benefits.
- Saving **EUR 12 billion** in energy costs per year by switching from old to new street lighting technology.

## Example projects Street lighting

### Redbridge - London, UK

- First CosmoPolis scheme in London Borough Redbridge (2005).
- Energy saving > 50% compared to high pressure mercury street lighting systems.

Before



After



### Wildau - Berlin, Germany

- Parking space at the A10 centre.
- Koffer2 CosmoPolis replacing high pressure mercury street lighting systems.
- Energy saving of 68%.
- CO<sub>2</sub> annual saving 98.7 ton.

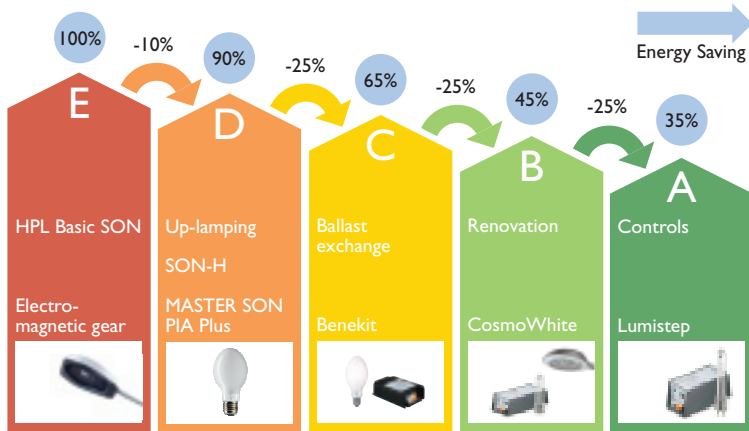
Before



After



# Street lighting system improvement



## Saving potential Home lighting - Facts and figures Homes

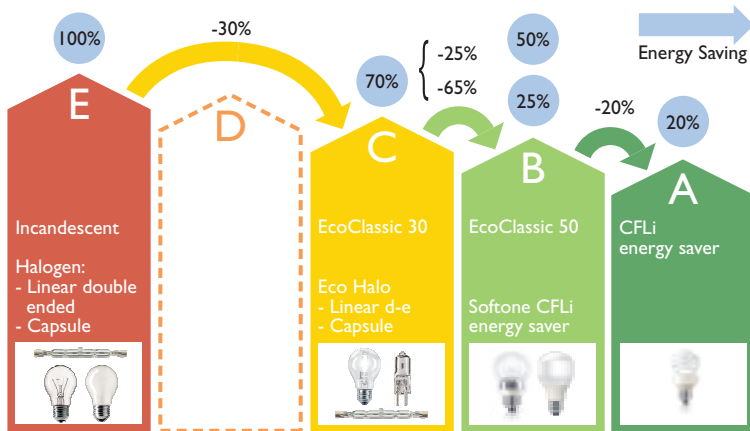
Saving potential	Global	Europe	North America	Latin America incl. Mexico	Asia Pacific	Middle East and Africa
EUR billion	46	10	16	3	12	5
Million tonnes CO <sub>2</sub>	239	38	83	9	79	30
Million Barrels of Oil Equivalent	685	156	235	51	174	69
# Power stations @ 2TWh/yr	228	52	78	17	58	23

## Home lighting can save up to 80% - Facts and figures Homes

- In 2007 around 13 billion incandescent lamps were sold world-wide, of which 75% are used in homes.
- The global installed base is still 75% incandescent vs. 25% energy savers.
- Simply switching incandescent lamps to other energy saving lighting technologies will result in an average saving of 70%.



# Home lighting improvement through up-lamping



### 3. Barriers to Switch

- Lack of awareness - people simply don't know the opportunities
  - Lighting is low interest.
  - People don't see the electricity costs of lighting.
  - They are not aware of the new lighting technologies.
  - Often decision makers are not lighting experts.
- Investment costs
  - Although energy efficient lighting technologies cost a little more (initially or renovation), they have attractive paybacks and save large amounts of energy/money during their lifetime.



## Policy measures: balance 'demand' and 'supply' - Philips position

Restrict SUPPLY of least efficient products

### Discouraging old inefficient technology

- Phase out Incandescent lamps
- Phase out standard TL
- Phase out High Pressure Mercury lamps
- Phase out EM gear for fluorescent lighting

Stimulate DEMAND of most efficient products

### Green Procurement

- Public procurement rules
- Renovation plan for buildings

### Financing Mechanisms

- Utility funding schemes
- Financial incentives

### Environmental performance targets

- Lighting measures in action plans
- Minimum energy performance standards for buildings

## Financing possibilities for energy efficient lighting

### How to overcome the upfront, initial cost hurdle

- **Consumers:**

- Utility funding (over energy bill)
- Private financing (city/regional level)
- Fiscal measures (differentiated VAT)

- **Business:**

- Energy Service Companies (ESCO models), Public Financing Initiatives (PFI's)
- Investors (building certification)
- Fiscal measures (tax deductions)

- **Government:**

- Public Private Partnerships (PPP's)
- Carbon trading
- Revolving renovation funds

Energy efficient lighting technology offers a unique Triple Win

1. Users/tax payers save costs and obtain better light quality.
2. The environment benefits from lower energy/CO<sub>2</sub> emissions.
3. Business/country competitiveness is strengthened.

Legislation plays a crucial role in realizing lighting's savings potential.

Energy efficient Lighting is an opportunity for all countries and will equally benefit its population as well as its future competitiveness.

## Notes on sources and calculations

- Global average 40% energy saving potential. Regionally differences exist based on installed lighting base, regional lighting preferences and present switching status.
- Advanced technologies have faster penetration with Energy Efficient products, others are slower.
- Market size figures come from various sources including Philips Lighting Central Market Intelligence.
- The energy saving EUR figures quoted are based on an electricity price of EUR 0.10 per kWh.
- Calculations for CO<sub>2</sub> are based on regional characteristics and therefore range between 0.3 and 0.8kg CO<sub>2</sub> per kWh.
- All figures underpinned by third party sources for calculations.

**For further information, please contact Harry Verhaar ([harry.verhaar@philips.com](mailto:harry.verhaar@philips.com))**



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