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Lighting the key to energy saving

By Richard Black
Environment correspondent, BBC News website

A global switch to efficient lighting systems would trim the world's electricity bill by nearly one-tenth.



Lighting uses more electricity than is produced by nuclear stations

That is the conclusion of a study from the International Energy Agency (IEA), which it says is the first global survey of lighting uses and costs.

The carbon dioxide emissions saved by such a switch would, it concludes, dwarf cuts so far achieved by adopting wind and solar power.

Better building regulations would boost uptake of efficient lighting, it says.

"Lighting is a major source of electricity consumption," said Paul Waide, a senior policy analyst with the IEA and one of the report's authors.

"19% of global electricity generation is taken for lighting - that's more than is produced by hydro or nuclear stations, and about the same that's produced from natural gas," he told the BBC News website.

The carbon dioxide produced by generating all of this electricity amounts to 70% of global emissions from passenger vehicles, and is three times more than emissions from aviation, the IEA says.

Lounge departure

Not many inventions last for more than 100 years without major modifications.

The incandescent light bulb, developed a century and a quarter ago by luminaries including Sir Joseph Swan and Thomas Edison, is one, and still produces almost half of the light used in homes around the world.

But incandescent bulbs are very inefficient, converting only about 5% of the energy they receive into light.



The biggest consumer is the fluorescent tube. Commercial and public sector buildings account for 43% of the electricity used for lighting; and here, fluorescents dominate.

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The report notes that the efficiency of tubes can vary widely, between about 15% and 60%.

Regulations on their use vary widely too. Health and safety concerns dictate what light levels should be achieved in various buildings, but the IEA found the levels prescribed by regulatory authorities vary by a factor of 20 from one country to another.

The IEA reserves particular ire for that favourite of the western middle-class lounge, the halogen uplighter.

"This... is the least efficient of all commonly used electric lighting systems," it says. "They add a large amount of heat into the living space as a by-product... this heat might require additional air-conditioning energy for its removal."

It is concerned too that a significant proportion of the world's population has no access to electric lighting at all. Instead they rely on burning fuel, which is expensive, inefficient, produces poor light quality and contributes to respiratory disease.

Bright idea

Energy-efficient lighting can seem such an obviously good idea that it is hard to comprehend why it is not used everywhere.

"There is no single panacea," said Dr Waide. "What we suggest is setting up a comprehensive set of policies.

"There is a strong case for introducing lighting measures into building codes. Currently codes have a lot of energy measures in them, but with few exceptions there aren't specific provisions for lighting."

Such codes could, for example, mandate the use of highly-efficient fluorescent tubes and ballasts, the devices which regulate input voltages for the lamps; at worst these can consume 40% of the energy going into the system.

China, the IEA reports, has recently developed such codes. If they are implemented in all new build, this would "...offset the need for a new Three Gorges Dam project every eight years".

For the individual, the most obvious switch to make is from incandescent bulbs to compact fluorescent systems (CFLs), marketed in many countries as "energy-saving bulbs".

The IEA calculated the total costs to the consumer associated

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EIGHT FOR THE SCRAPHEAP



Incandescent bulbs
Low-efficiency fluorescent tubes
High-loss "ballasts" for fluorescent tubes
Halogen uplighters
High-loss halogen transformers
Mercury discharge lamps (often used in street lighting)
Low-efficiency vehicle lighting
Fuel-based lighting in developing countries

with buying and then using the two types, and found a significant difference.

"The overall cost of 10,000 hours of light provision from incandescents is 85 euros," said Paul Waide, "but for CFLs it's 25 euros, because they use so much less energy, and because you might have to buy only one CFL for every 10 incandescents."

He acknowledged there were concerns about the quality of light coming from some CFLs, and that some consumers reported lower lifetimes than manufacturers claimed; the key here, he said, is better regulation of the product sector by governments.

"There is also a lot that governments could do to reduce the price differential between CFLs and incandescents; it's extremely efficient from a societal perspective."

The future may see even more efficient systems. LEDs hold out the most promise; currently four times as efficient as incandescents, manufacturers are aiming for 80% efficiency by the end of the decade, which would represent a 16-fold improvement on the traditional bulb.

But, the IEA concludes, there is no need to wait for LEDs. Policy measures and individual action to bring the switch would slash 38% from the global electricity bill for lighting by 2030.

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