



**better lighting energy efficiency :: start saving money today.....**

**I**t is time to banish the light bulb as an icon for bright ideas, assigning the tungsten incandescent lamp to our museums. Really, little has changed since its invention over 100 years ago. Electricity passing through a coiled wire called the filament, causing the filament to glow, which in turn emits light photons, and heat. Nowadays lamps to extend the life of the filament are filled with an inert gas, such as argon to prevent premature oxidation and failure – still 1000 hrs is the best that one can expect.

However, all is not lost - a simple upgrade using modern lighting technology provides compounding benefits for building owners, and prevents pollution. From the engineering perspective upgrading your lighting system also creates additional benefits. Many of these added benefits are overlooked whilst considering investment decision:

#### **Electrical System**

- A.1. Reduces lighting electricity consumption OPex (kwh)
- A.2. Reduces chiller plant capacity lowering consumption OPex (kwh)
- A.3. Reduces chilled water pump capacity - OPex (kw). [cube law]
- A.4. Reduces air handling capacity - OPex (kw) [cube law]
- A.5. Reduces heat rejection capacity OPex (kw)
- A.6. Reduces losses, lowering OPex and capex [ $P = I^2R$ ]
- A.7. Reduces CAPex for overall electrical system including cables, switches, switchgear, distribution boards, etc.

#### **Air Conditioning System**

- B.1. Lower casual load, reduces air conditioning requirement
- B.2. Lowering air handling equipment and fan requirement [cube law]
- B.3. Lower chilled water requirement, smaller pipe sizes
- B.4. Lower chilled water pump capacity.
- B.5. Reduces plant space need - saving development area for other uses

- B.6. Reduces duct size, and grille sizes, reducing duct pressure loss required. [square law].
- B.7. Reduces heat rejection OPex
- B.8. Reduced CAPex

#### **Indoor Environmental Quality Improvements**

- C.1. Lowering room mean radiant temperature
- C.2. Reduces room noise [less airflow]
- C.3. Improves working environment.

#### **Externalities Improvements**

- D.1. Reduced power required lowering power generation pollution [0.6kg/CO<sup>2</sup>/Kwh].
- D.2. Reduced heat rejection, lowering heat island effect.
- D.3. Smaller heat rejection equipment reduces environmental noise pollution.
- D.4. Reduces GHG (greenhouse gases) emissions
- D.5. Lowering environmental mercury pollution

Changing just one 100watt incandescent lamp for a compact florescent lamp (CFL) saves more than HK\$ 700, and that excludes the bonuses from improved externalities.

#### **Further Information**

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