

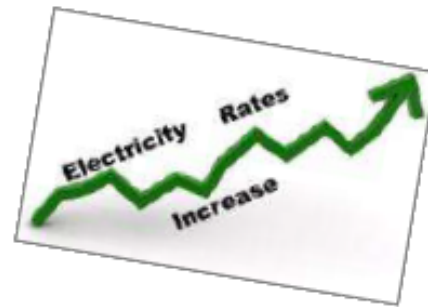
PERHITUNGAN OTTV

MK. Penilaian Bangunan Hijau
Baju Arie Wibawa, S.T, M.T

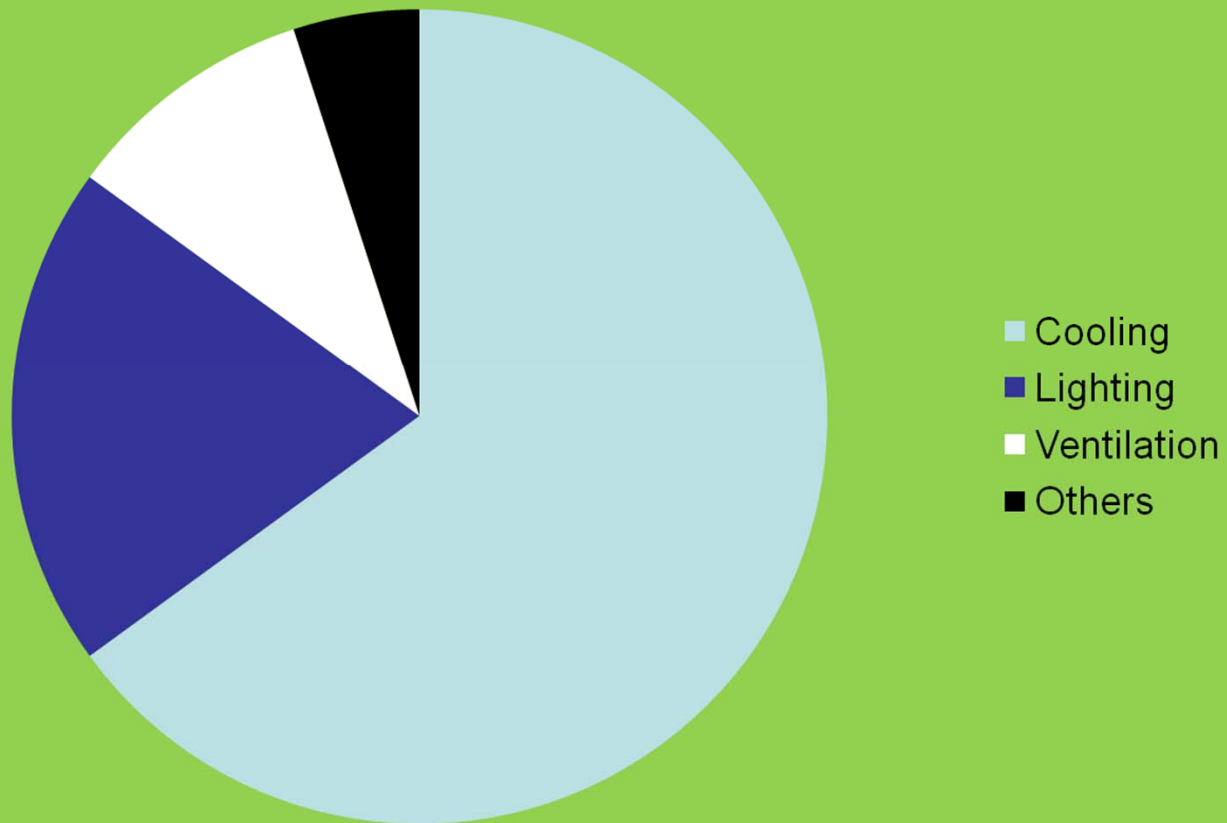
Building Consumption



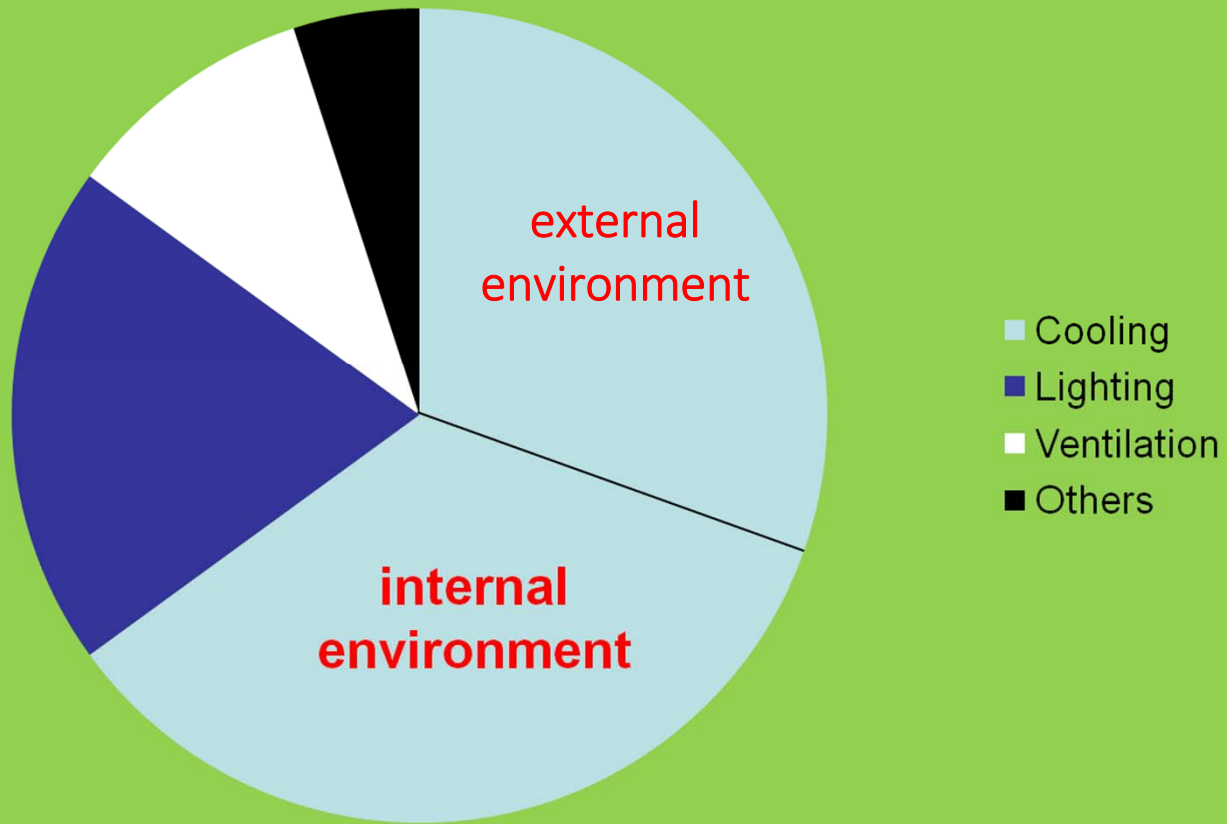
Source: United Nations Environment Programme Report



TYPICAL OFFICE ENERGY USE



TYPICAL OFFICE ENERGY USE



GREEN BUILDING



DKI Jakarta Government Regulation No. 38/2012

- **OTTV $\leq 45 \text{ W/m}^2$** (Mandatory for New Building)
- Implementation in DKI Jakarta ~Apr 23, 2013



Bandung Government Regulation No. 1023/2016

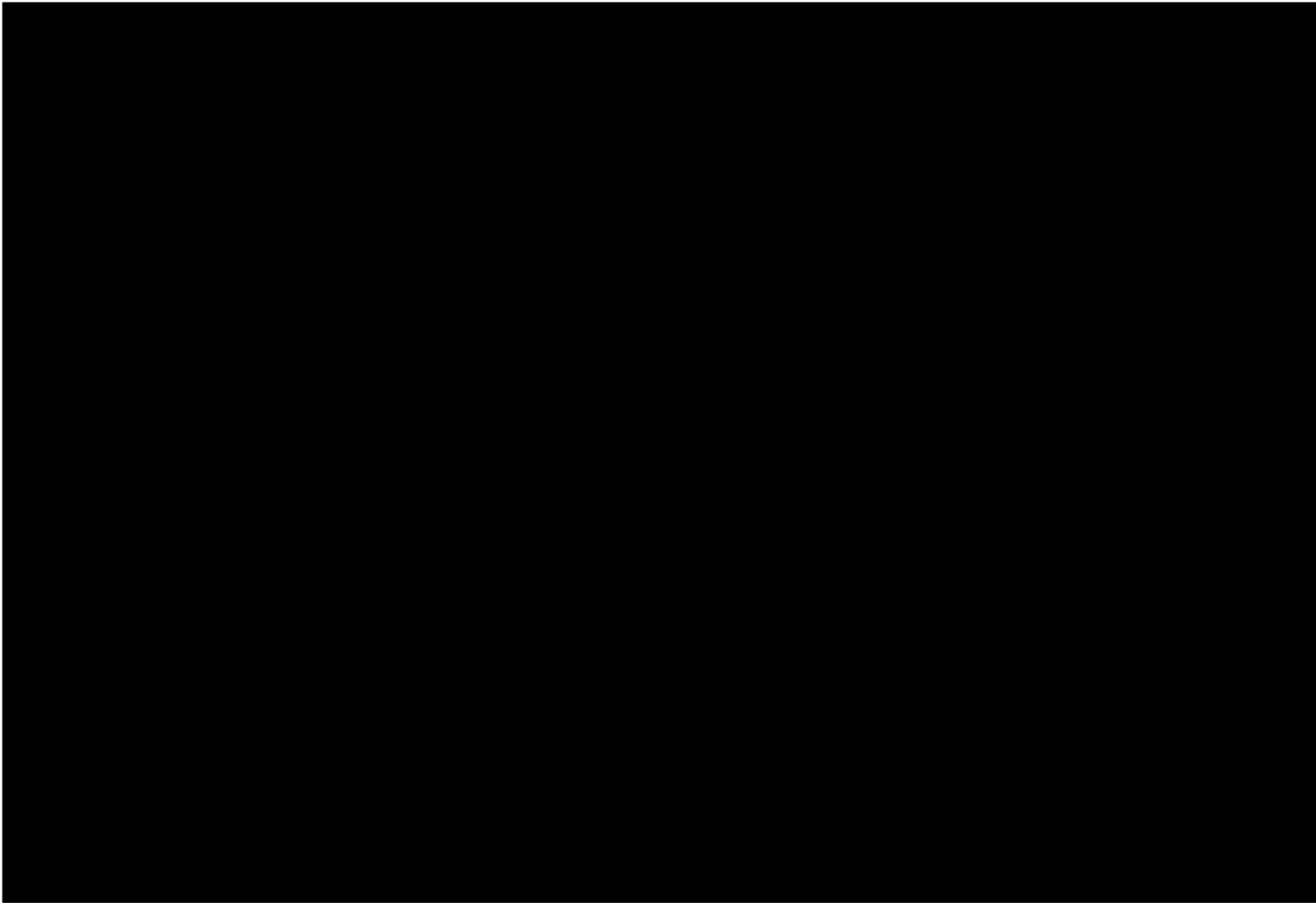
- **OTTV $\leq 45 \text{ W/m}^2$** (Mandatory for New Building)
- **OTTV $\leq 35 \text{ W/m}^2$** (Voluntary with incentive)
- Implementation in Bandung ~Jan 1, 2017

PENEGNALA OTTV

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Overall Thermal Transfer Value (OTTV)

Adalah Harga perpindahan termal menyeluruh pada dinding luar yang memiliki arah atau orientasi tertentu (W/m^2)



OVERALL THERMAL TRANSFER VALUE



WATTS PER M²

HEAT W / m^2 =

x skin area



Q_{gs}
glass
solar



Q_{gc}
glass
conduction

Q_{wc}
wall
conduction

OTTV



$$T_{\text{deq}} \times (1-\text{WWR}) \times U_w + D_T \times \text{WWR} \times U_f + \text{SF} \times \text{CF} \times \text{WWR} \times \text{SC}$$

DIFFERENT SHADING REFERENCE VALUE

SOLAR CORRECTION FACTOR

OTTV

SOLAR ABSORPTION FACTOR

BLACK	0.9 – 1.0
WHITE	0.15 – 0.3
SILVER / ALUMINIUM	0.1

OTTV

$$15 \alpha (1 - WWR)U_w + 6 (WWR)U_f + (194 \times CF \times WWR \times SC)$$

SOLAR WARMTH THROUGH GLASS



Q_{gs}
glass
solar

80%



Q_{gc}
glass
conduction

10% -
20%

Q_{wc}
wall
conduction

5%



SC SHADING
COEFFICIENT

$$SC = SC_1 \times SC_2$$

don't forget

SC

α

U



Overall Thermal Transfer Value (OTTV)

$$\text{OTTV} = \alpha((1-\text{WWR}) * U_w) * T_{\text{Deq}} + (\text{WWR} * U_f * \Delta T) + (\text{WWR} * \text{SC} * \text{CF})$$

Wall factor

Fenestration / Glazing Factor

1. Identify which component contributes the most to OTTV.
2. Review Solar Correction Factor (CF)
=> Review building orientation (east, west, north, south)

3. Review glazing selection
=> Shading Coefficient (SC) & U Value (Uval)

4. Review sunshades
=> Will further improve glazing SC

5. Review WWR & Wall Material (Uw & TDeq)



For Glazing :
WWR, SC & U-Value are dominant factors in OTTV ...

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BEST PRACTICE
GEDUNG KEMENTERIAN PU