

Energy Efficiency in New Buildings

The Danish Experience

Webinar

6 June 2013

Jesper Ditlefsen

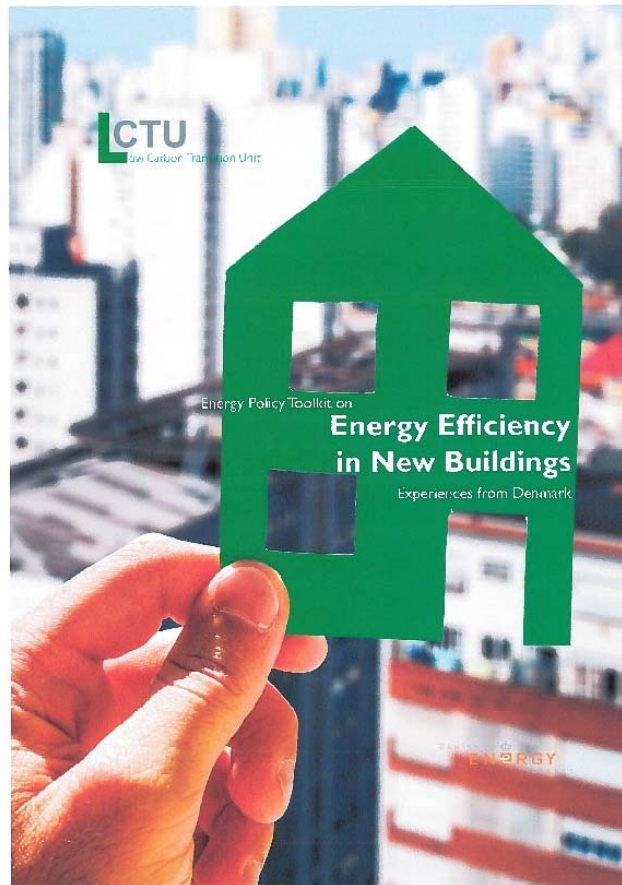
Head of Section

Danish Energy Agency



Energy Efficiency in New Buildings

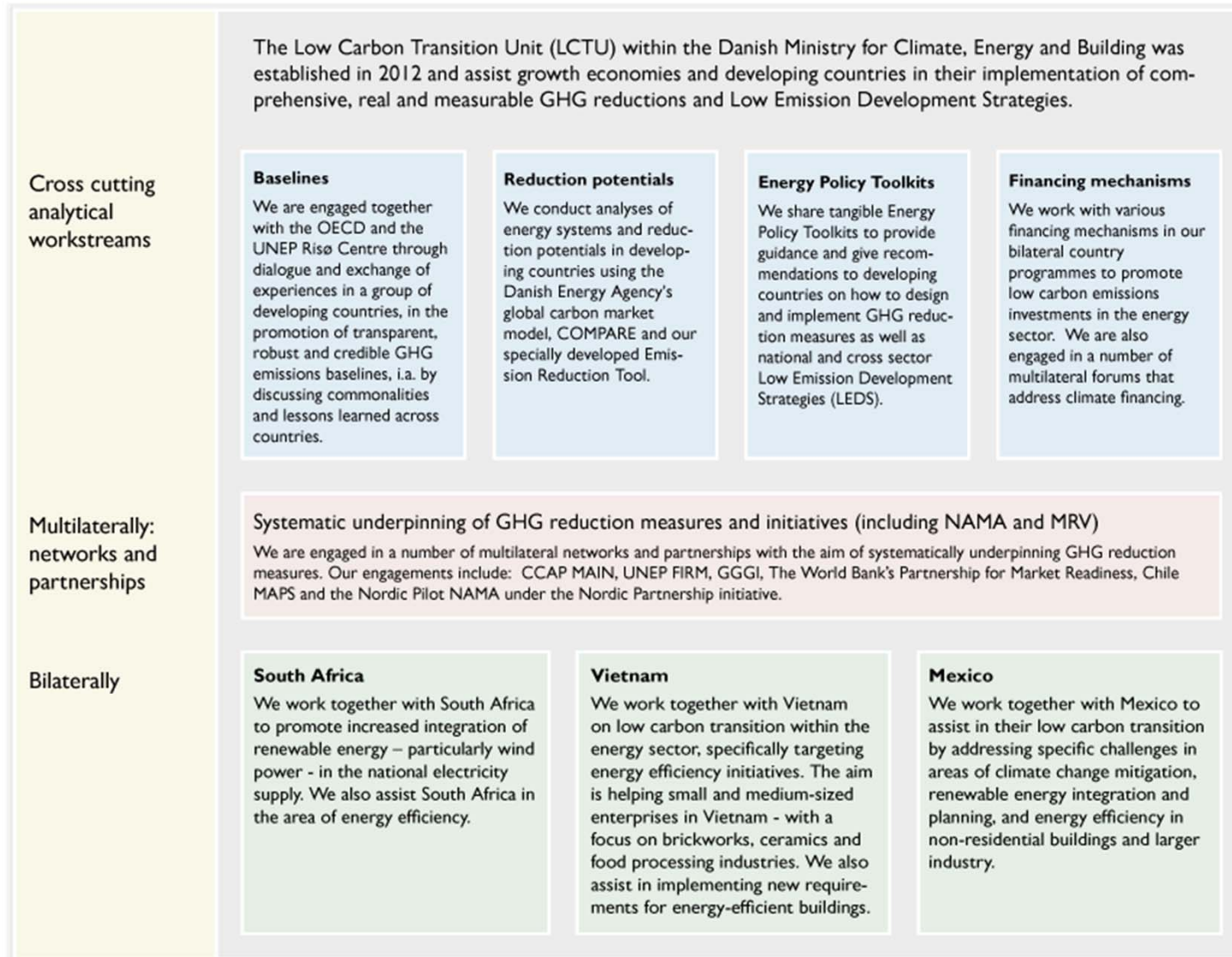
Toolkit by the Low Carbon Transition Unit, Danish Energy Agency



CESC webinar
6 June 2013

Peter Larsen
Head of Section
Danish Energy Agency

Our work



Effects in 2020 of agreed policies

These are the headline results for 2020:

2020

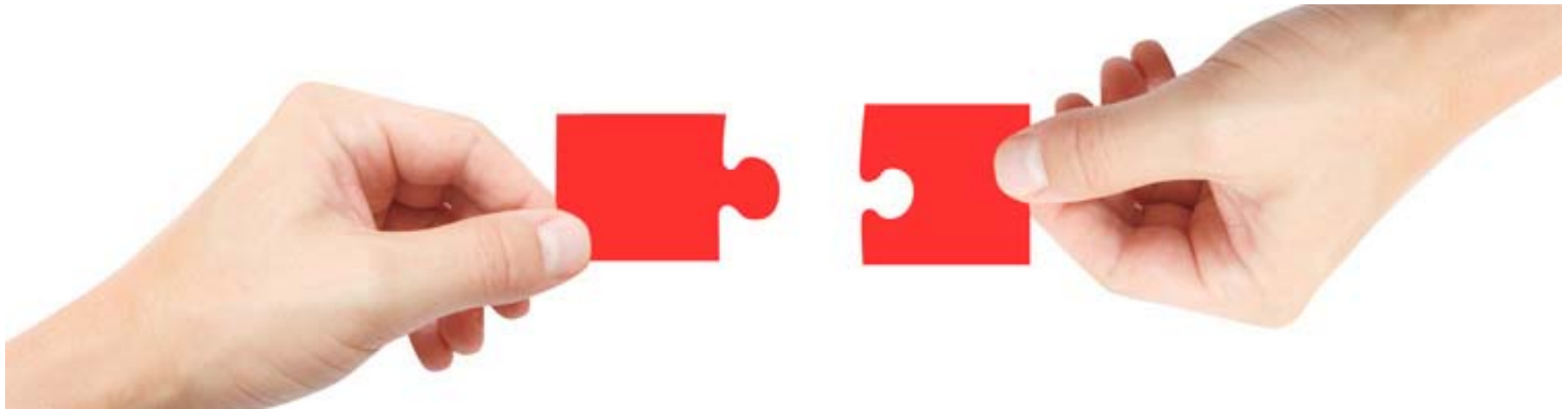
More than 35% renewable energy
in final energy consumption

Approximately 50% of electricity
consumption to be supplied by wind power

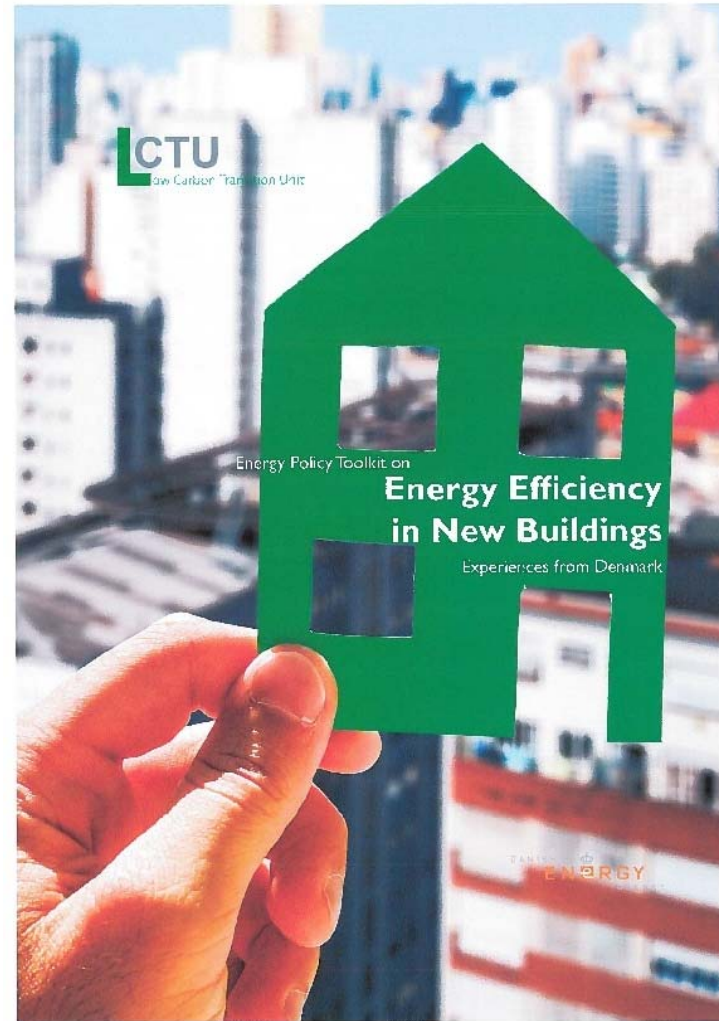
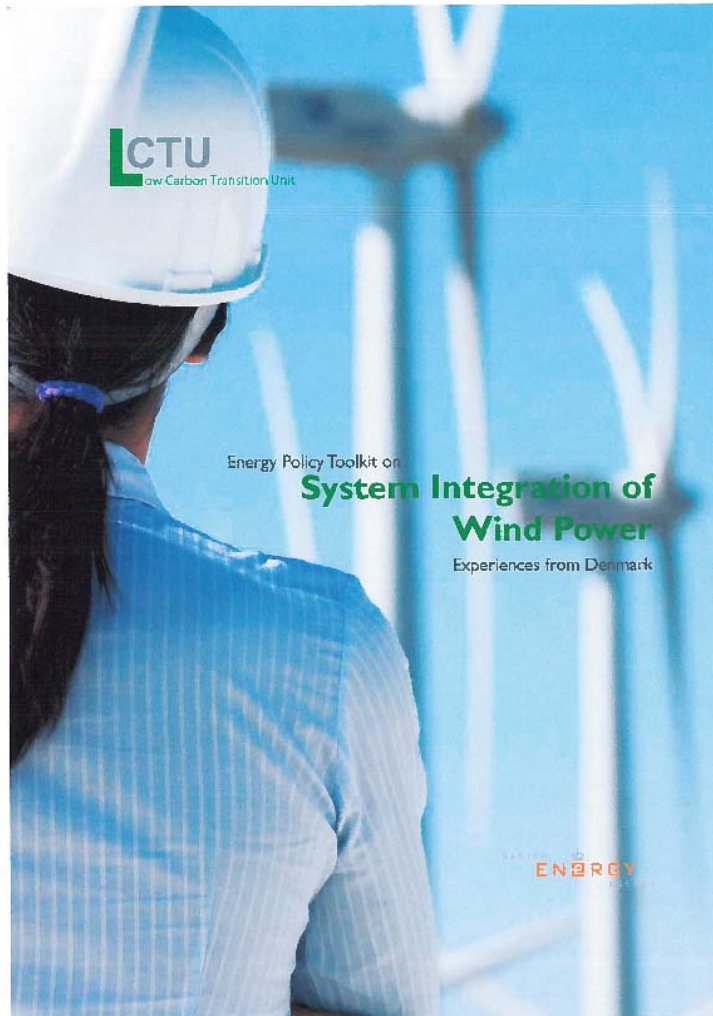
7.6% reduction in gross energy
consumption in relation to 2010

34% reduction in greenhouse
gas emissions in relation to 1990

Sharing our experiences...



Energy policy toolkits



- More information at:

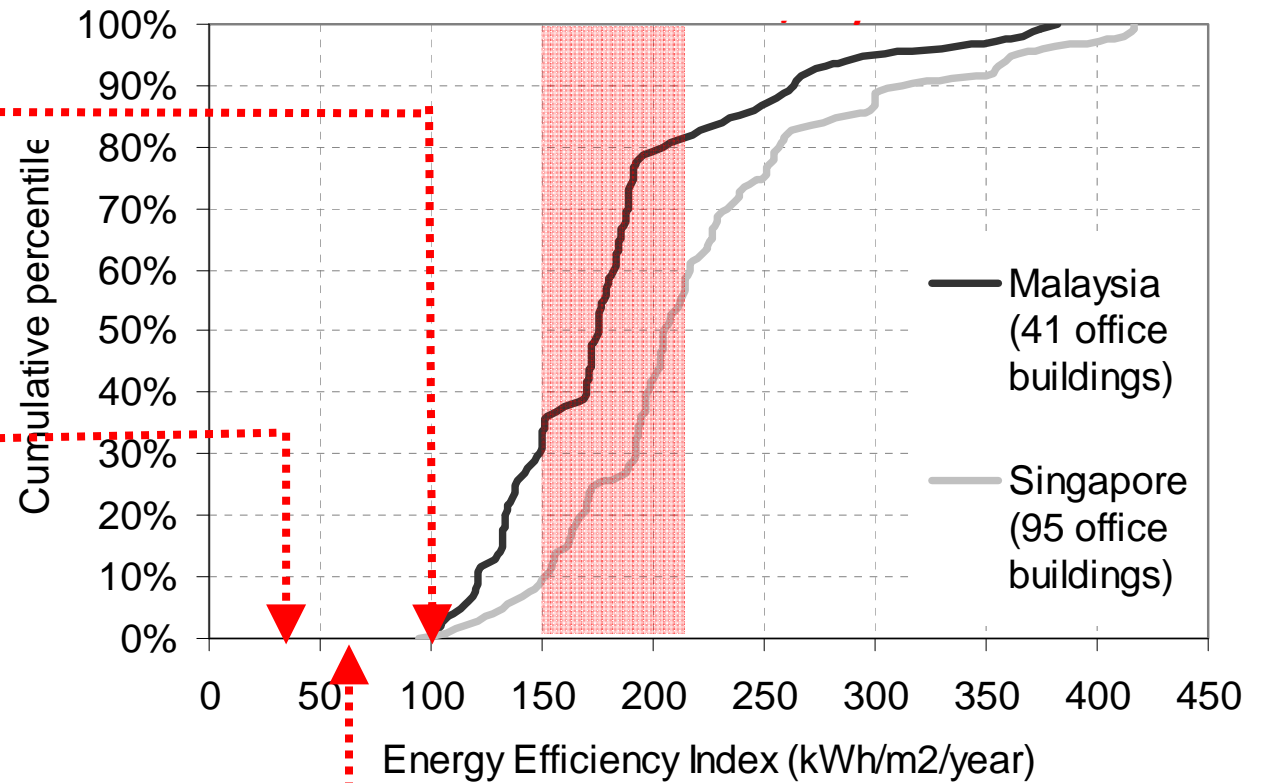
www.ens.dk/LCTU

- Peter Larsen (pla@ENS.DK)

Slides by Jesper

“Stamps of Approval” by Post Malaysia

Energy Efficient Office Buildings in Malaysia – Hot and Humid

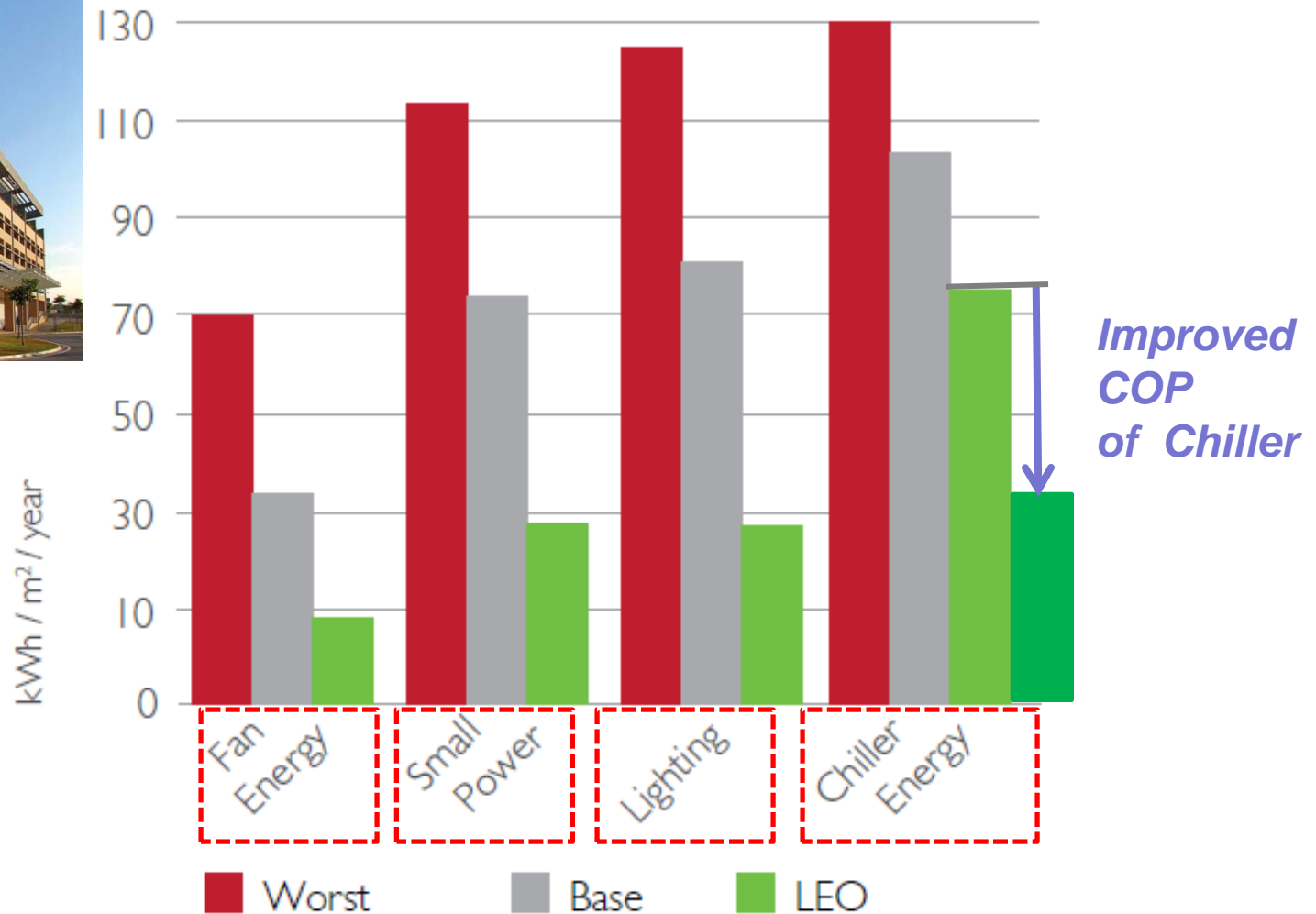


Source: EAEF Project 64
Project leader: National University of Singapore, 2006

Reduce Internal Electricity Consumption and thereby Reduce Chiller Energy also



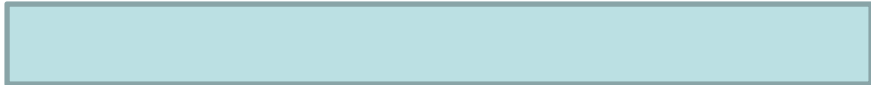
**LEO Building in
Malaysia**
District Cooling



Energy Efficient Ventilation

Optimisation of the LEO Building

70 kWh/m²year : Base Case



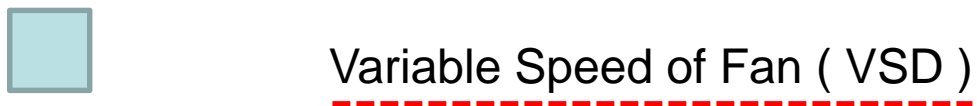
35 kWh/m²year



20 kWh/m²year



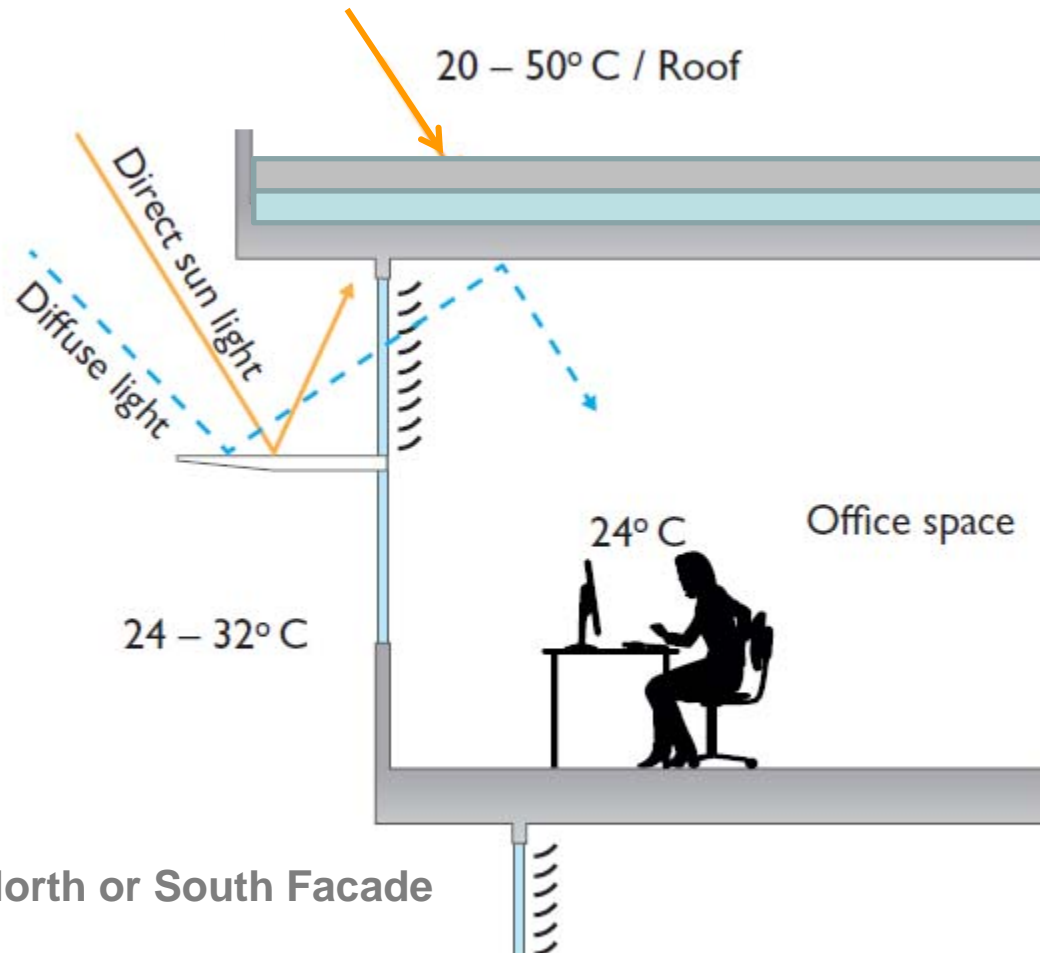
7 kWh/m²year



Daylight Optimized Architecture In the Tropics

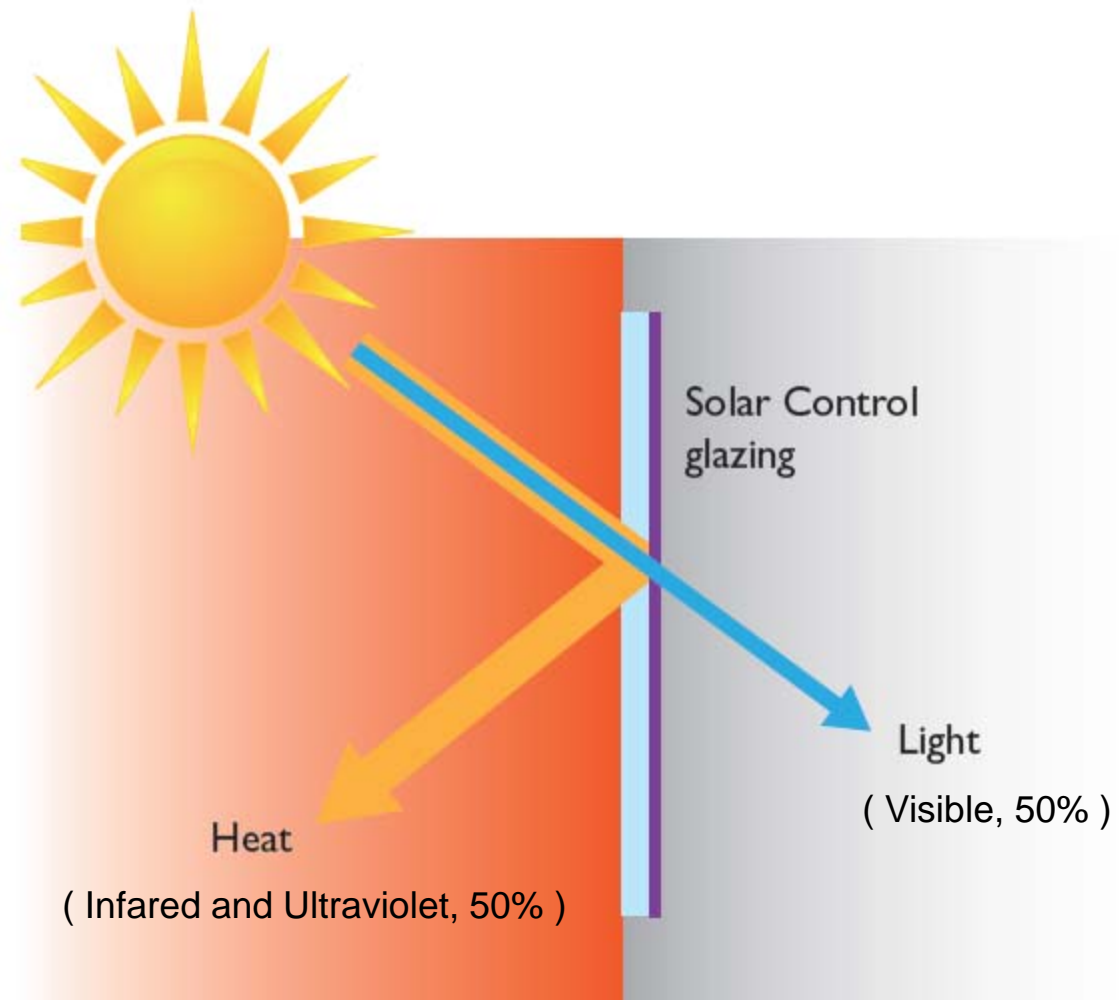
(ZEO Building in Malaysia, IEN Consultants)

- **Thermal Insulation in Roof** (100mm)
- **Glare Protection** : Fixed Blinds
- **Shading and light redirection**
Exterior Light Shelf

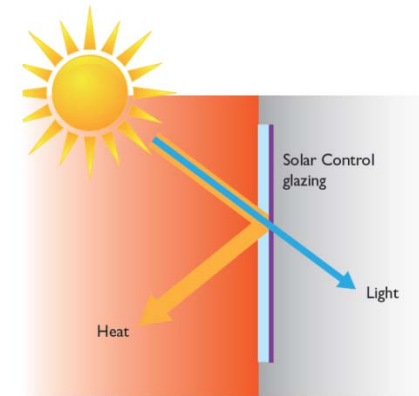
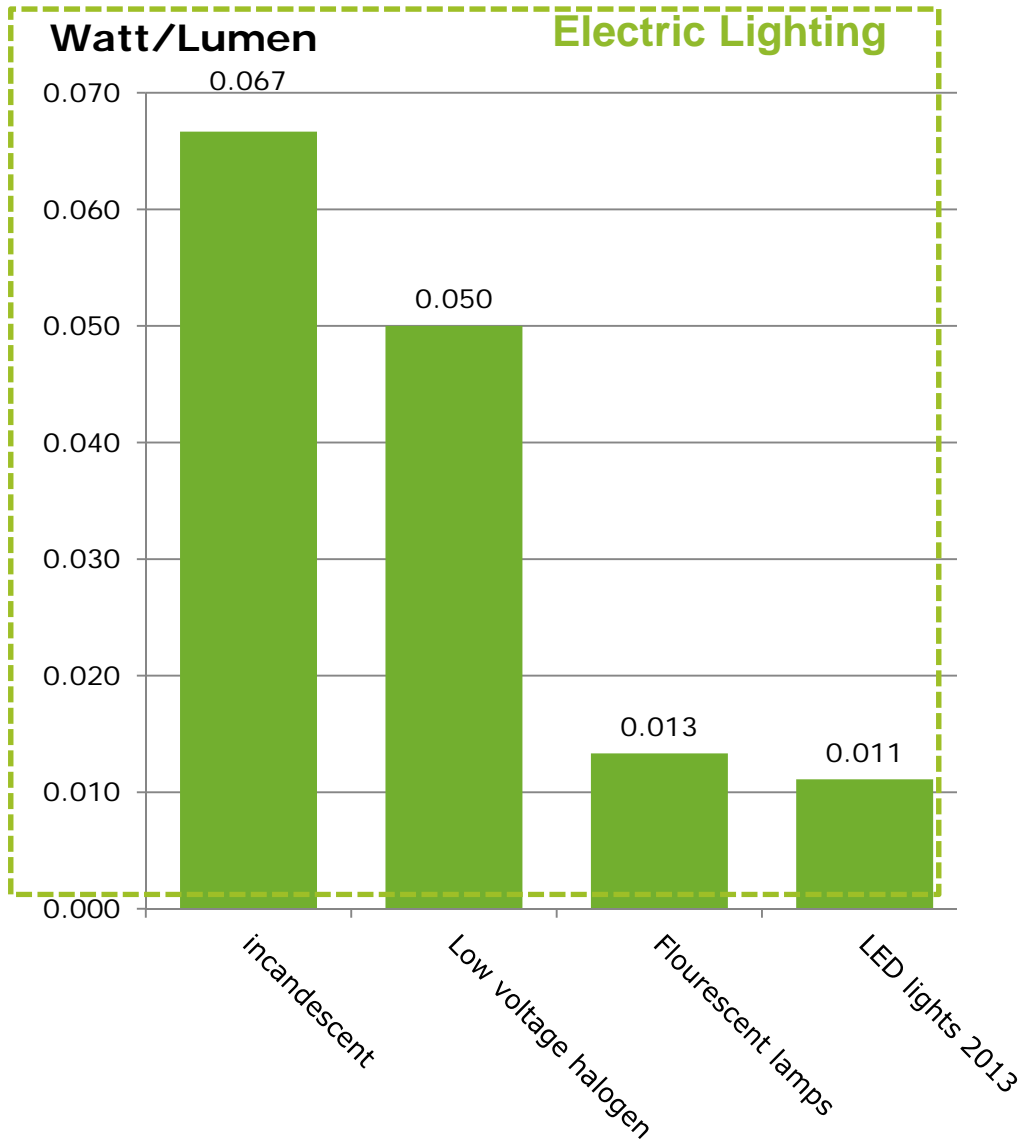


Offices are 98 % Daylit During Daytime 8.00 – 18.00

Spectrally Selective Glazing is Optimal in the Tropics



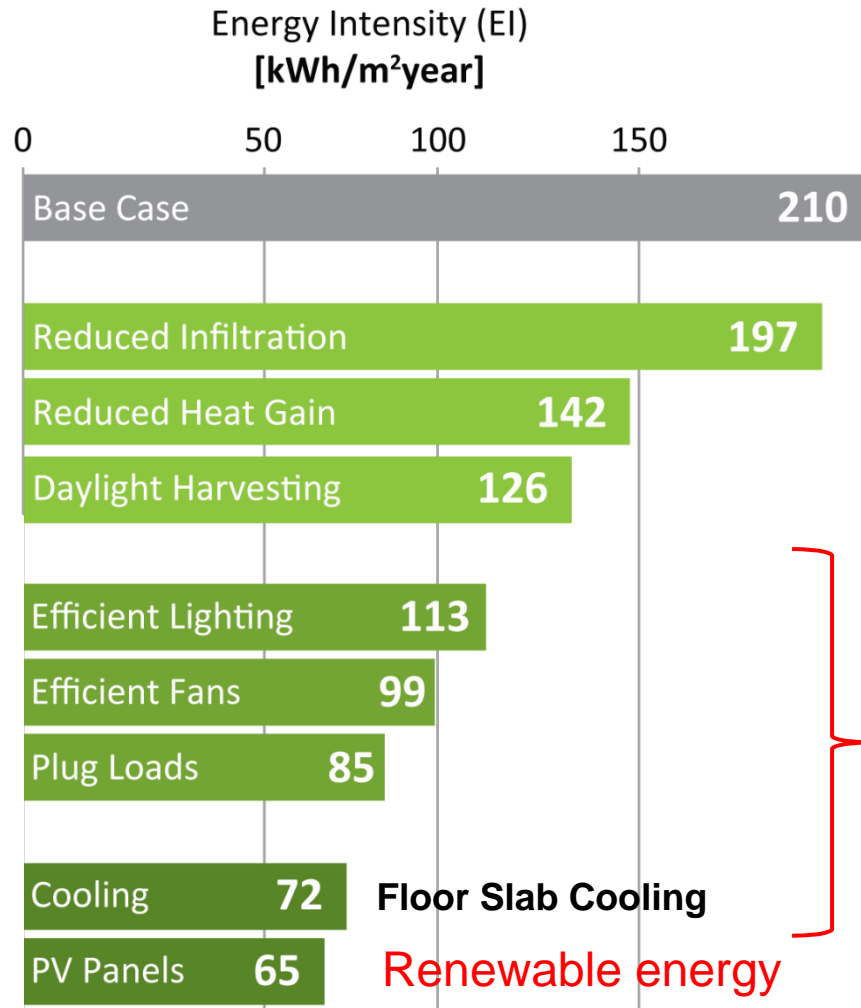
Energy Efficient Lighting **Daylight is the best and cheapest**



sunshine
sky daylight
LED light 2020
"light"

DANISH
ENERGY
AGENCY

Energy Optimisation of the Diamond Building in Malaysia



”Passive Design”

”Active Design”



Actual Energy Performance : 65 kWh/m²year

Energy Management is important

Economic feasibility of EE Buildings

- LEO Building : 50% savings, 5% extra costs
- GEO Building (experimental) : 50% savings, 5% extra costs
- Diamond Building : 65% savings, 4% extra Costs,



KL Eco City in Kuala Lumpur
IEN Consultants Sdn Bhd

- **KL Eco City Office Tower 3 (2013) : 50% savings, 3% extra costs**
New, not included in the Energy Policy Toolkit

KL Eco City, Office Tower 3 for the KL City Council (DBKL)

- ❖ Energy Index : 105 kWh/m²year against normal 210 kWh/m²year (50% down)
- ❖ Extra Costs for Double Solar Control Glazing : 1.2 million US\$
- ❖ Consequential Cost Savings on Chiller Investment : 0.58 million US\$



- *Integrated Energy Design reduces extra costs and improves economic feasibility*

Overall key points

- The potential for energy efficiency in new buildings is
 - *Huge* and its realisation is
 - *Cost efficient*
- However, market failures such as split incentives mean that many new buildings are built with poor energy performance...
- Therefore regulation and effective implementation and enforcement is crucial and spurs innovation.

