

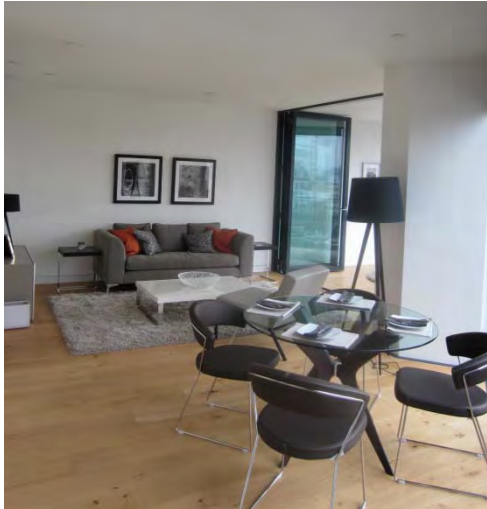


# CICID 10<sup>th</sup> Anniversary Conference

*Building Automation is the  
Key to Zero Carbon future*

Ir Conrad Wong, JP  
Chairman of Hong Kong Green Building Council  
31 May 2013

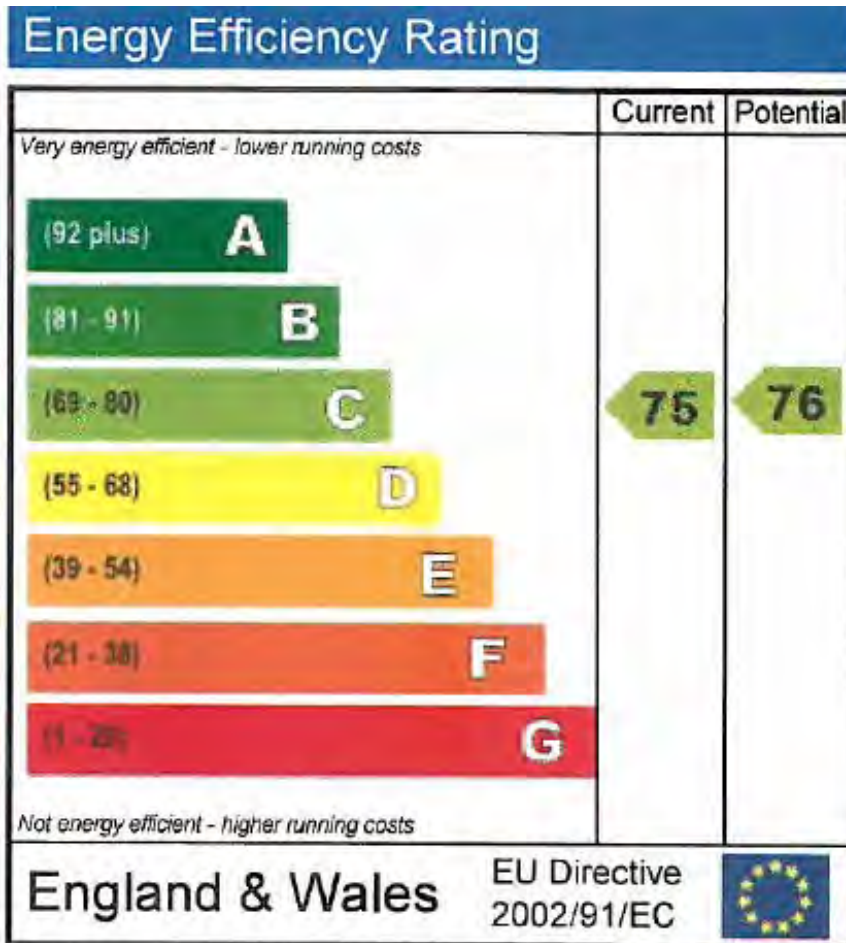
# NEO Bankside Apartment



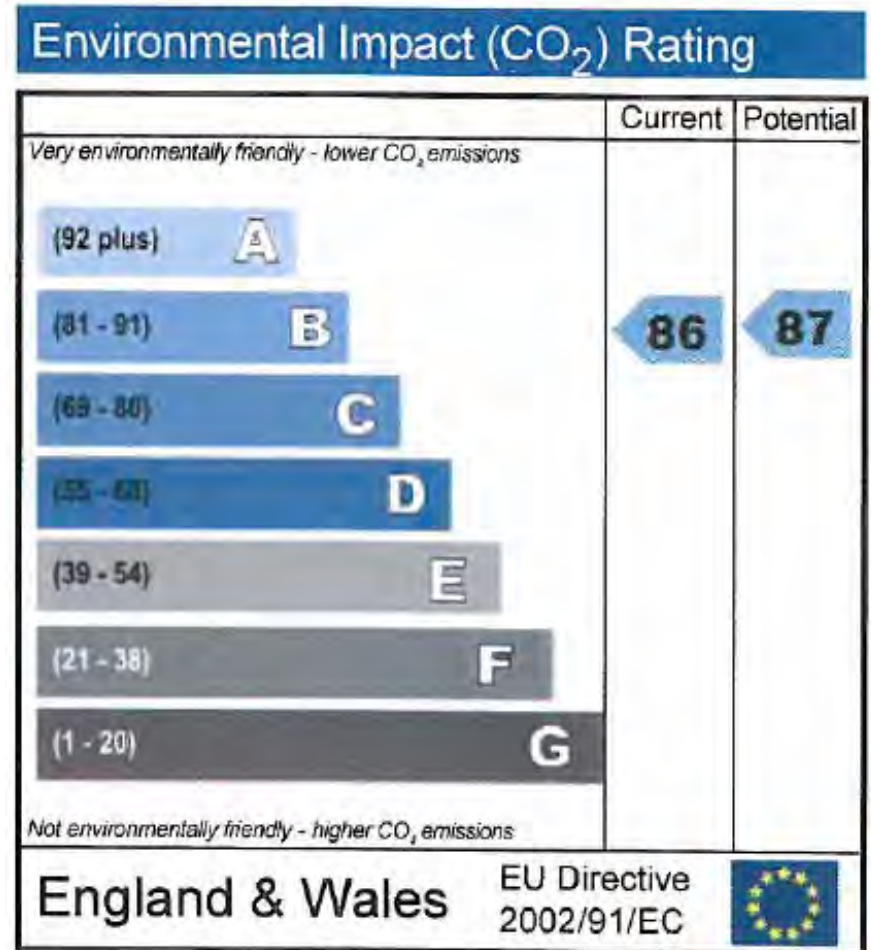
NEO Bankside by  
Rogers Stirk Harbour + Partners



# Energy & Carbon Label



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO<sub>2</sub>) emissions. The higher the rating the less impact it has on the environment.

# Outside View from NEO Bankside

- Saturday Evening at 7:00pm
- Construction Project – Phase 5 of the development

All the lighting & heating were on!



# Outside View from NEO Bankside

- An office building opposite to the apartment



No energy simulation in the World will assume the lighting be turn on at 7:00pm Saturday evening!



# Yau Lee office Thermostat

- Saturday Evening at 3:30pm



Temperature Thermostat

# My conclusions are

- As far as Energy Saving is concerned, human being is :

Lazy



Convenience

Unreliable



Forget

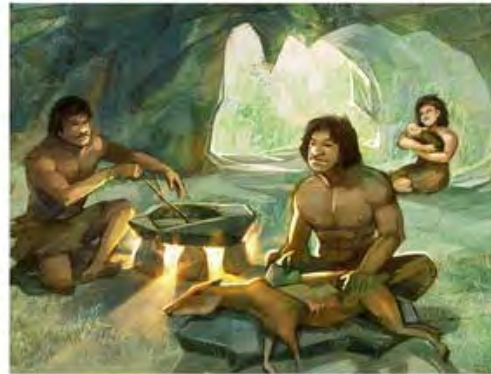
Not trust worthy



Do not do what we told

# The Caveman Principle

- Man reserves our energy for hunting and mating, i.e. Food and Sex
- This is in our human nature.
- This is causing a huge problem, because.....





# CO<sub>2</sub> Emission in Hong Kong



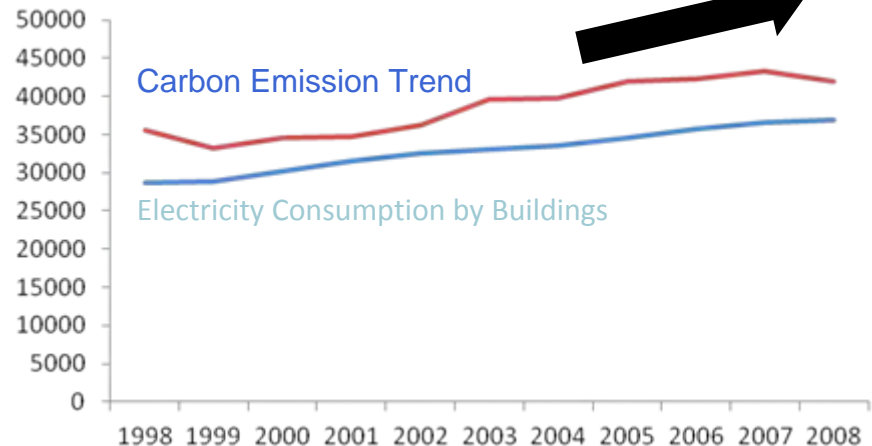
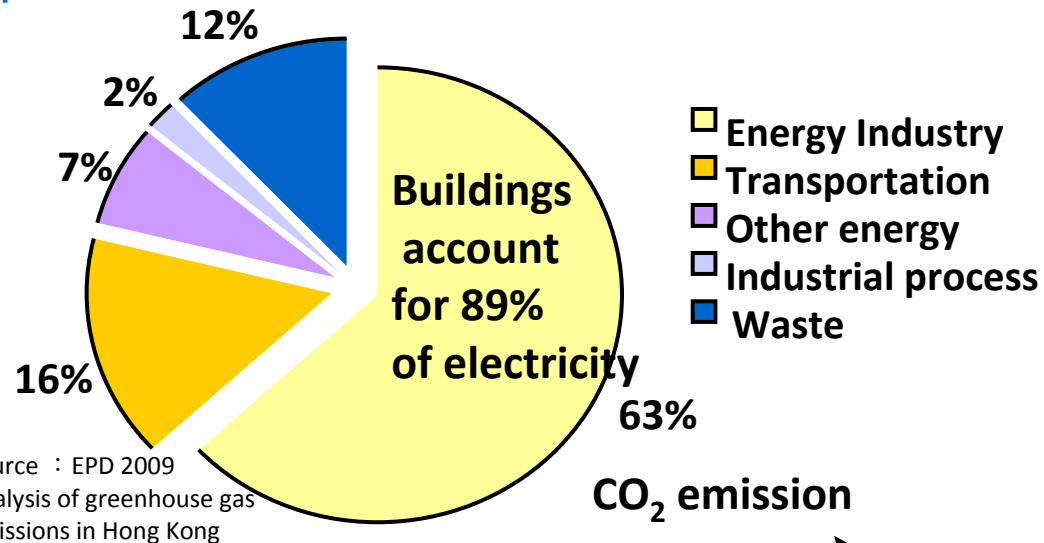
HK GHG Emission per person: 5.5 tons CO<sub>2</sub>e  
Equals the use of 2.2 planet resources

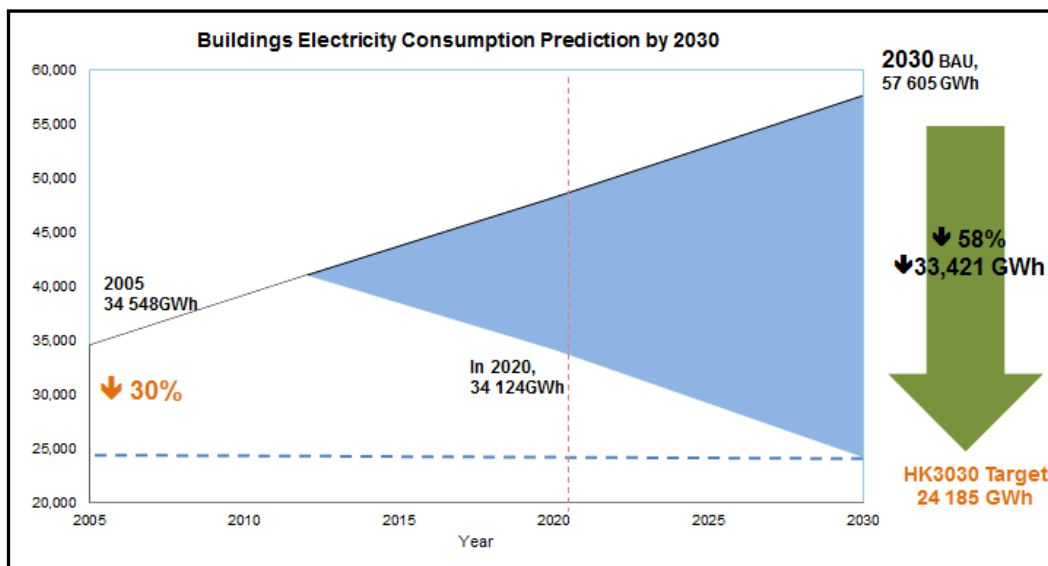


According to the trend,  
by 2030 it will take 3  
Earth to sustain our  
lifestyle!



**Irresponsible!  
Not Sustainable!**





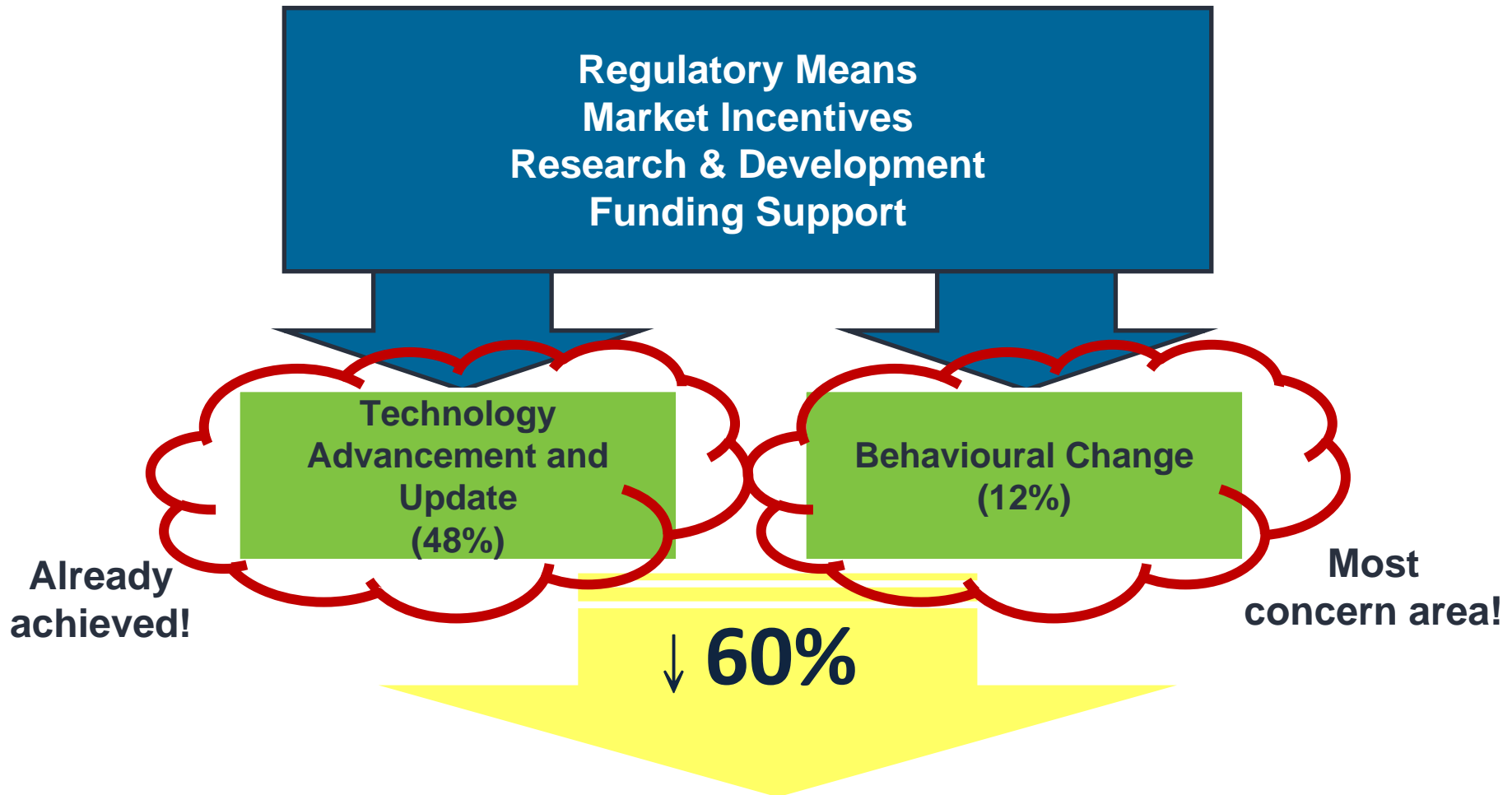
- Set up a long term reduction target for HK
- Propose strategies and policies to improve building energy efficiency
- Enhance the transformation of green buildings in HK

### Electricity Consumption of HK in 2030

- **30%** absolute reduction in Electricity Consumption in Buildings by 20**30** (using 2005 as the baseline)
- Based on our projection, the actual reduction in 2030 will be roughly 60% of the total electricity consumption in Hong Kong
- Focus on **Demand Side Management (DSM)**



Under BAU scenario, **HK3030** corresponds to the Reduction of Electricity Consumption of Buildings by roughly **60%** per meter square in **2030**



**We can control the equipments but not human!**



# Human Behaviour for Change

“As I often tell my wife:  
Don’t expect me to change!”

**Unless.....**

It is more convenient to me than before, or  
provide me with better comfort, or  
It is total transparent to me  
(i.e. I don’t even know it exists or I don’t need to do anything!)

# My Experience in Building Automation: Holiday Inn Express Hong Kong SoHo



**The 1<sup>st</sup> triple platinum rating hotel in the world**

**HK BEAM-Plus  
Platinum (Final)  
Achieved points : 79.8**



**US LEED Platinum  
Achieved Points : 82**



**BCA Green Mark  
Platinum**



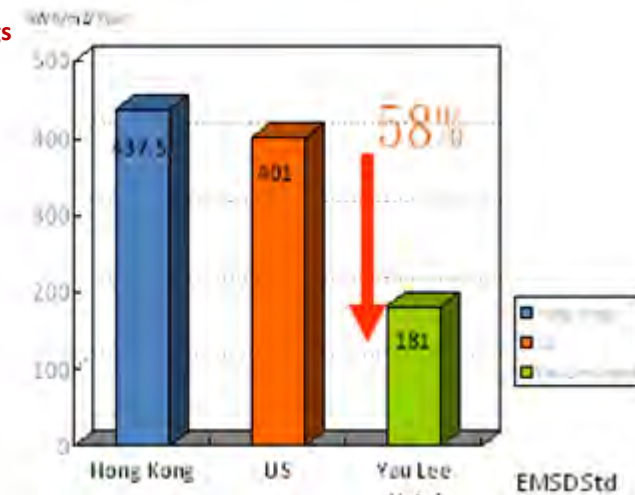
**3 Star** 3-Star System  
(In process)



**Achieved max. points under  
energy used**

**Asian Institute of Intelligent Buildings  
Intelligent Hotel  
(Distinction Rank)  
Of 2012**

**Green Building Award  
2012 – Merit Award**



# iFancoil

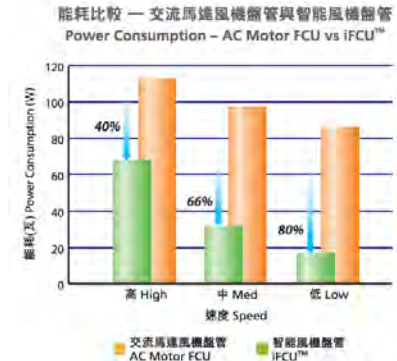


## Energy Saving Smart Intelligent Fan Coil Unit – iFCU™

Energy Saving Solution by using high efficiency **permanent magnet motor** and control driver

### Advantages

- (1) Energy consumption is reduced by 40%-80%
- (2) Variable speed
  - 5 speeds control (Super, High, Medium, Low, Extra Low)
- (3) Temperature control accuracy up to  $\pm 0.5^{\circ}\text{C}$
- (4) Motor heat dissipation is lowered from 58% - 95%
- (5) Much lower noise level



Speed	IFCU™ motor (°C)	AC motor (°C)	Diff. %
Low	1.2	26.9	95%
Middle	2.3	18.1	87%
High	4.9	11.6	58%

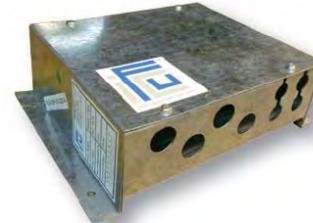
Operating temperature rise of motor



Fan Coil Unit



Permanent Magnet Motor



Control Box

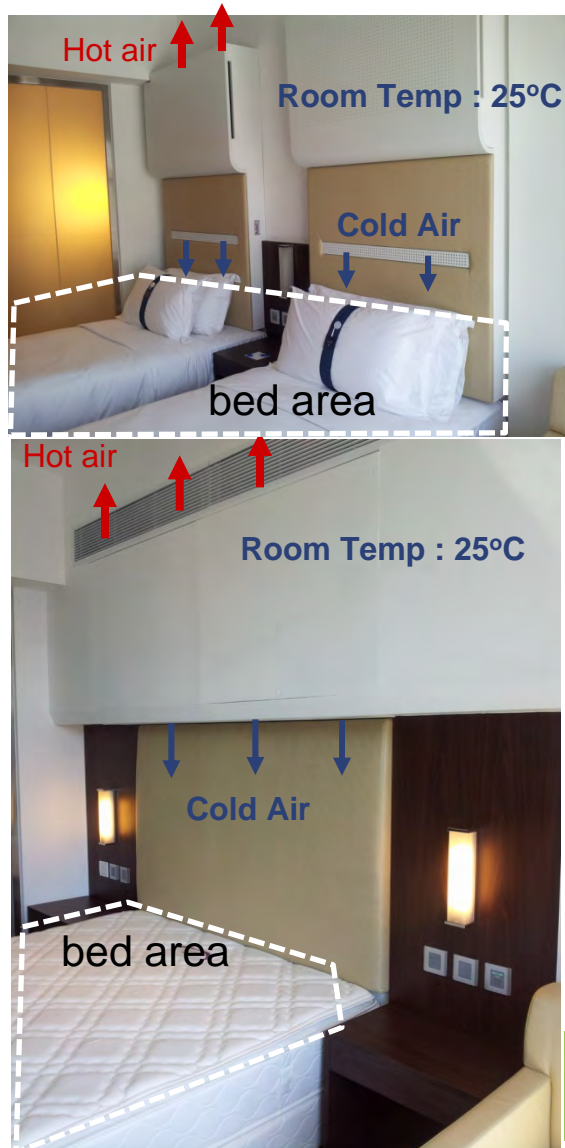


Intelligent Programmable Thermostat

**Fully automatic & save money with better comfort!**



# Peliter Headboard



## Principle:

- Intelligent Personal cooling concept
- Turn on after 1 hour when the light is switched off
- Using peltier cooling technology to lower the temperature about 2-3°C around the bed area while the room temperature remain at 25°C. Automatic disable the preset temperature.
- Energy to cool down the spaces out the bed area will not be wasted
- Resume back to the preset temperature at 6:00AM
- The guest should not even know the system exists

## Advantages:

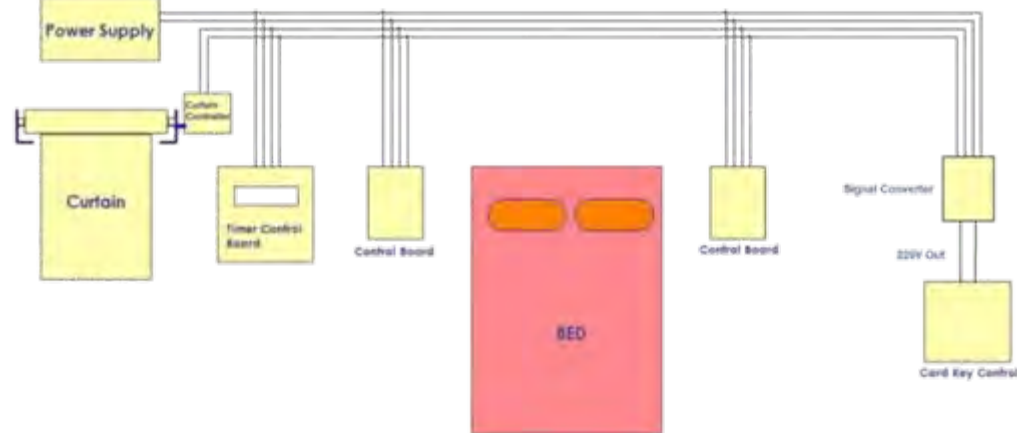
- Electricity for chiller can be reduced
- Further enhance the cooling comfort at bed area

**Total transparency & save energy**

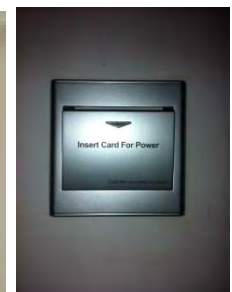
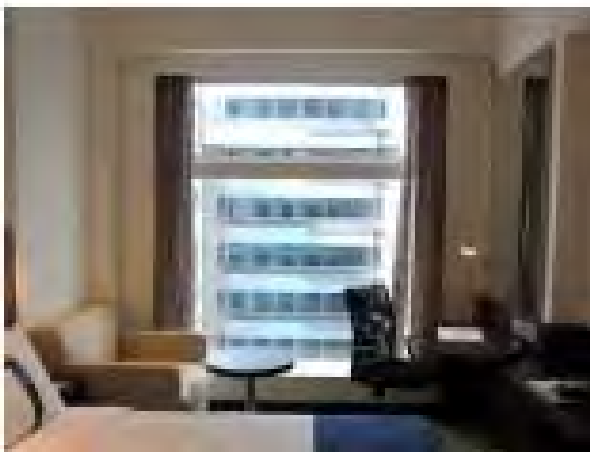
# Motorized Roller Blind System

- Installation of Motorized roller blind system at 274 guestrooms
- Roller blind auto closed when guest leaves, open again when guest enter the room
- Reduction of solar heat gain
- Minimized lighting pollution at night

Roller Blind System Control Logic Diagram



Roller blind auto open when guest lock in



Roller blind auto closed when guest leaves

**Fully automatic & reduce heat load**

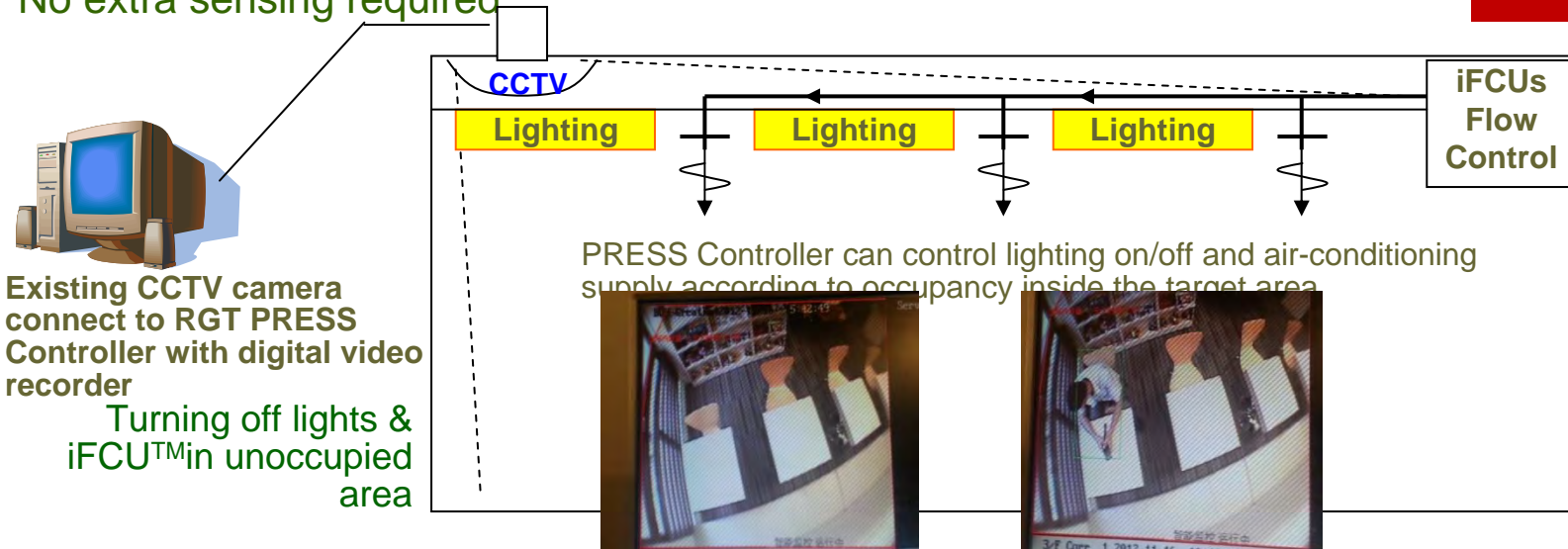
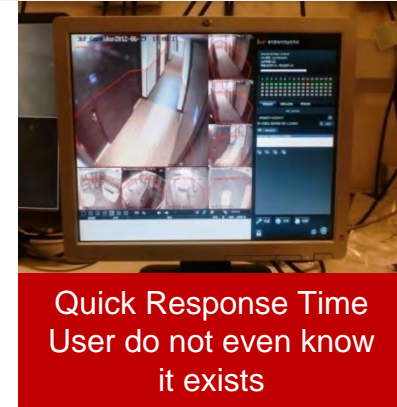
# Pattern Recognition Energy Saving Solution “PRESS”

## ONE Invention TWO Applications

### Pattern Recognition Energy Saving Solution “PRESS”

“PRESS” provides additional energy saving solution to the traditional CCTV cameras –

- Application of pattern recognition software and electronic interfacing devices with CCTV cameras to control the on/off lighting and air-conditioning system according to occupancy inside the designated area
- No extra sensing required



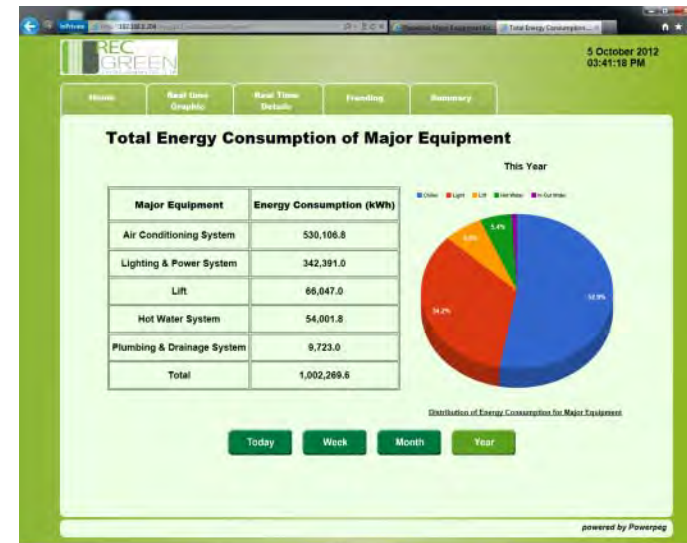
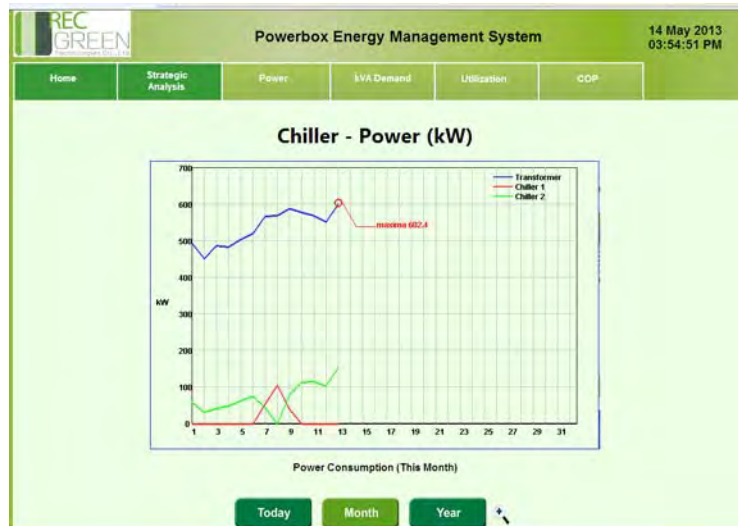
Turning CCTV into a motion detection sensor  
Provide more convenient without reducing human comfort & energy saving



# PowerBox™

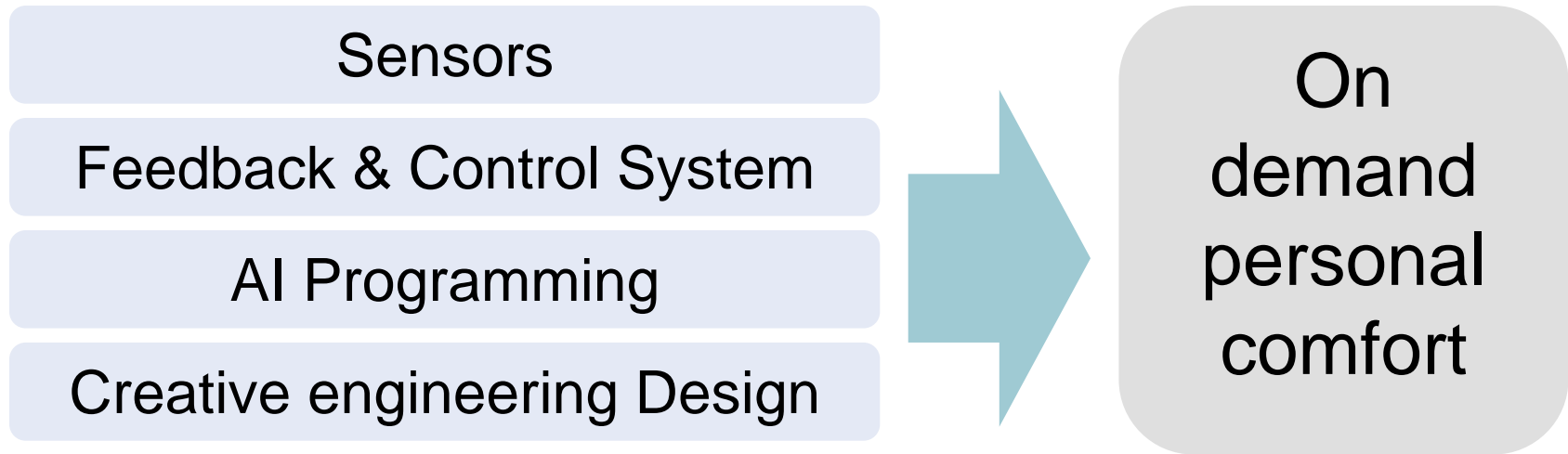
## PowerBox™ - On-line energy management and monitoring reporting software

- Real time online energy data logging
- Energy data management and analysis solution
- Peak Demand Reduction
- Energy related notification and alarms
- ➔ Real time data and continuous monitoring
- ➔ Immediately reporting and analysis



Real time feedback & enforce behaviour change

# Building Automation



- Creating Building Automation System to encourage behaviour change: **Become lazier**
- Do not need to touch anything, the system will do it all automatically for you with your personal comfort setting.

# Why do we still need switches?



- When I enter my room, the system should know who I am, where I am, what I want for my comfort today and adjust it for me.

**Building truly become intelligent!**



# Optimization

- Sensor is becoming cheaper and cheaper
- Control system cost is much reducing
- Computer power is much faster then before
- Engineering Design is getting better & better
- Automation is no longer expensive nor difficult to build
- With real time data, real time optimization is possible
  - Lighting level
  - Cooling demand
  - IAQ



Then we can achieve

**Behavioral Change**  
**↑ 12% energy saving**



# Why building automation is so important?

- We need to live in a carbon free world without losing the modern comfort and efficiency.



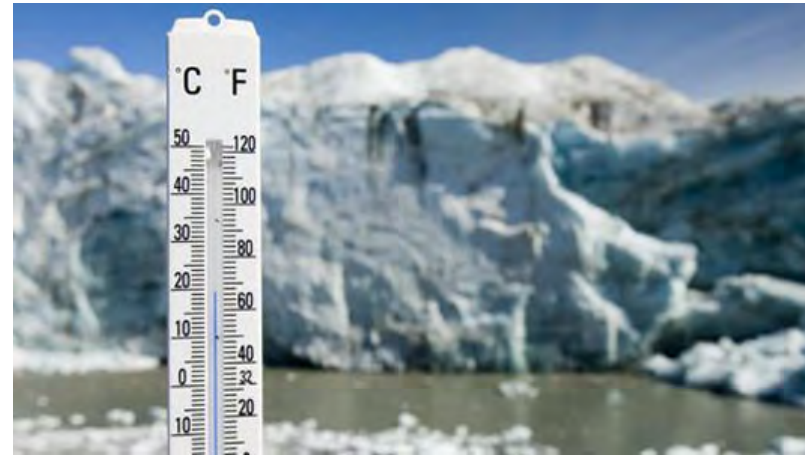
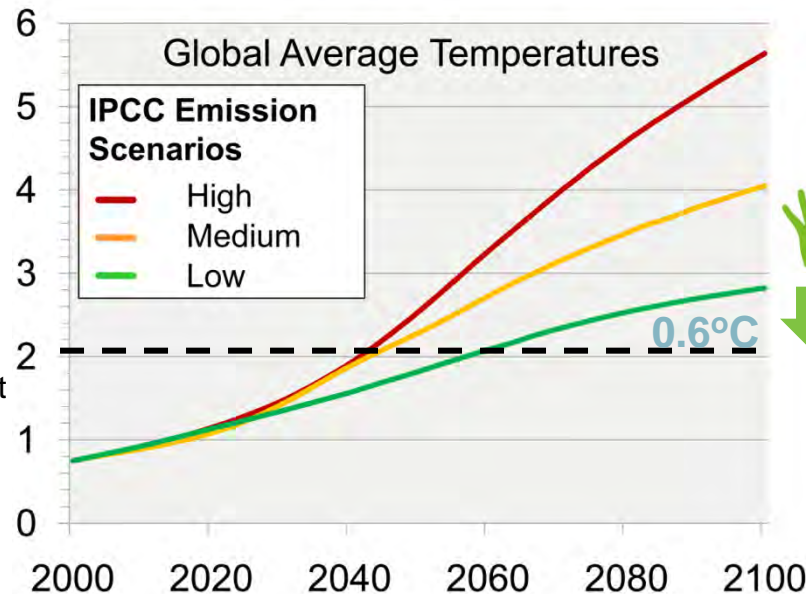
**Perhaps the biggest challenge for the human race.**

# Global Temperature Change

## Living Warmer: How 2 Degrees Will Change the Earth?

- Changing the average global temperature by even a degree or two can lead to serious consequences around the globe.

### Prediction of Increase in Global Temperature



In combating Climate Change, **HK3030 Campaign** can help to relieve roughly **0.6°C** temperature rise in the context of Hong Kong.

However, to avoid irreversible damage to Earth, severe measures must be taken to sustain the future of human being.

# What can we do better?

- We need to be more aggressive than lowering 60% per meter square in building energy consumption.  
**[The HK3030 campaign]**
- We need to cut our energy down by as much as 80% or more! If we want to resolve our global warming problem.
- We can only do it with better building automation design and more intelligent building ever than before.
- Building Automation is the key to our zero carbon future!





# Conclusion



In HK context, the superman who can save the planet is Building Professional i.e. Us! Especially the building automation engineers because you can make people lazier and still enjoy the same comfort level with much lower energy consumption.

**That's engineering! Thank You!**