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THE CASE FOR
LOW CARBON CITIES: Malaysia Programme

IEN Consultants *http://www.ien.com.my/*

Carbon Trust *https://www.carbontrust.com/home/*

Alissa Raj *alissa@ien.com.my*
A collaborative presentation by
IEN Consultants & Carbon Trust

PRESENTATION OVERVIEW

The Case for Low Carbon Cities:

Leadership & Governance

1. The Case for Low Carbon Targets

2. Low Carbon Cities: *Malaysia Programme*

    i. Local Initiatives
    ii. Carbon Trust

3. Feasibility for Developers: *Case Studies from IEN Consultants*

4. Conclusion

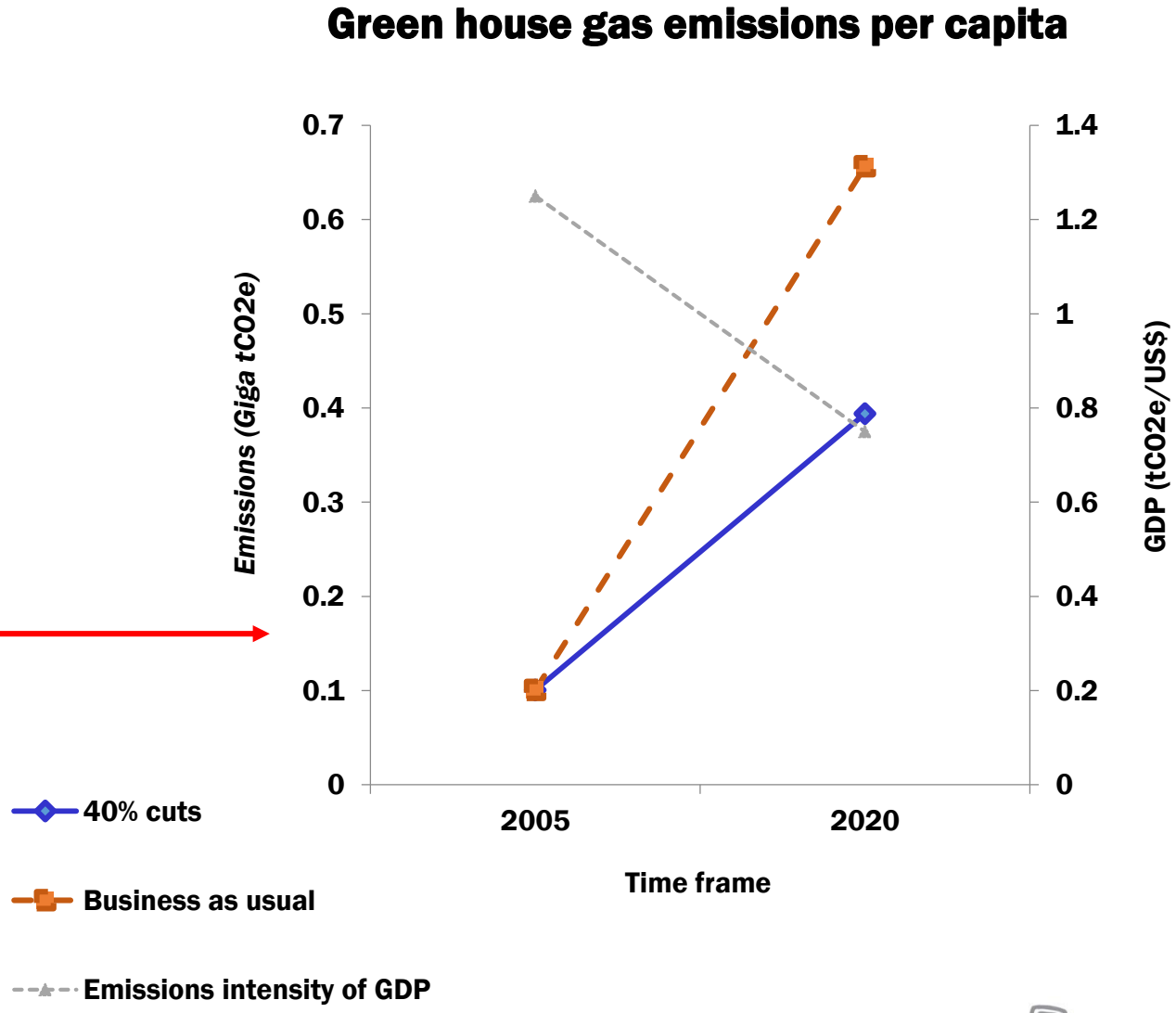
THE CASE FOR LOW CARBON TARGETS

In the Built Environment

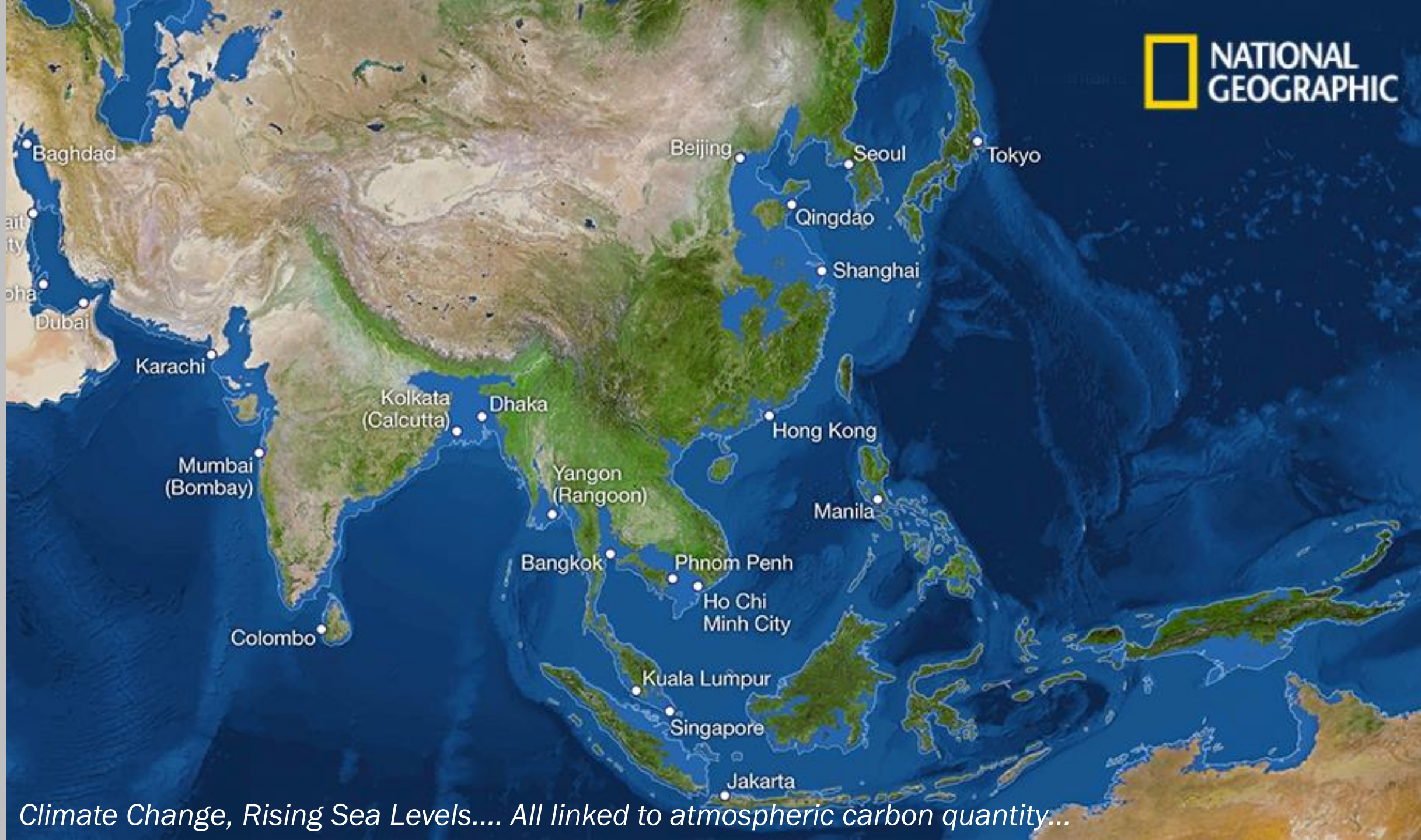
National Targets for Carbon Emission Reductions

At COP 15 in Copenhagen, Prime Minister YAB Dato' Sri Mohd Najib Tun Abdul Razak announced **that Malaysia would voluntarily reduce its emissions intensity of GDP by up to 40% based on 2005 levels by 2020. We have an extended target to 45% by 2030.**

This is the visual representation of our National Target



PUTTING IT INTO PERSPECTIVE

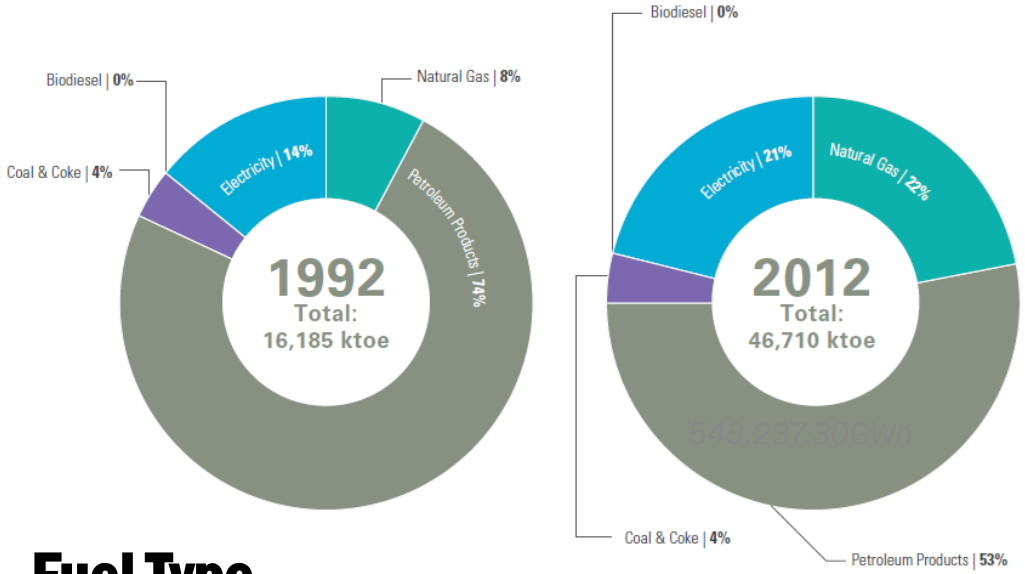


Climate Change, Rising Sea Levels.... All linked to atmospheric carbon quantity...

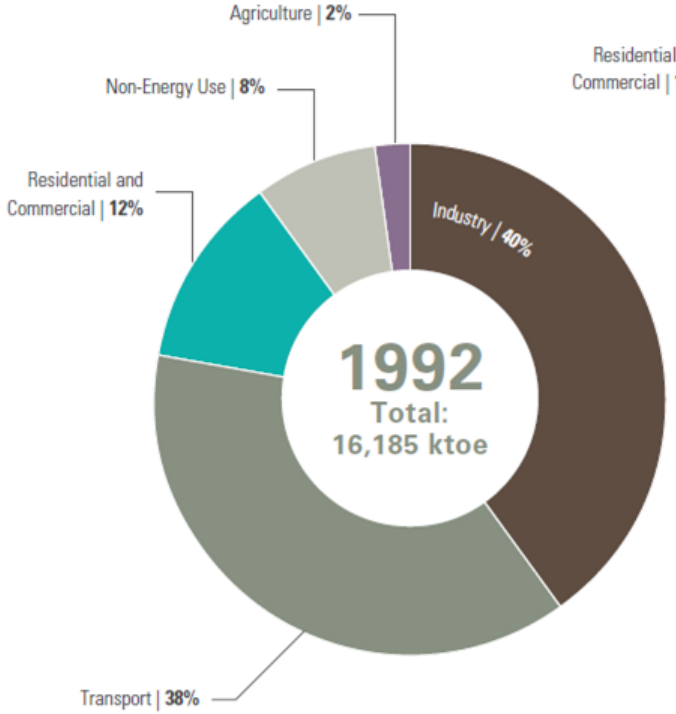
ENERGY

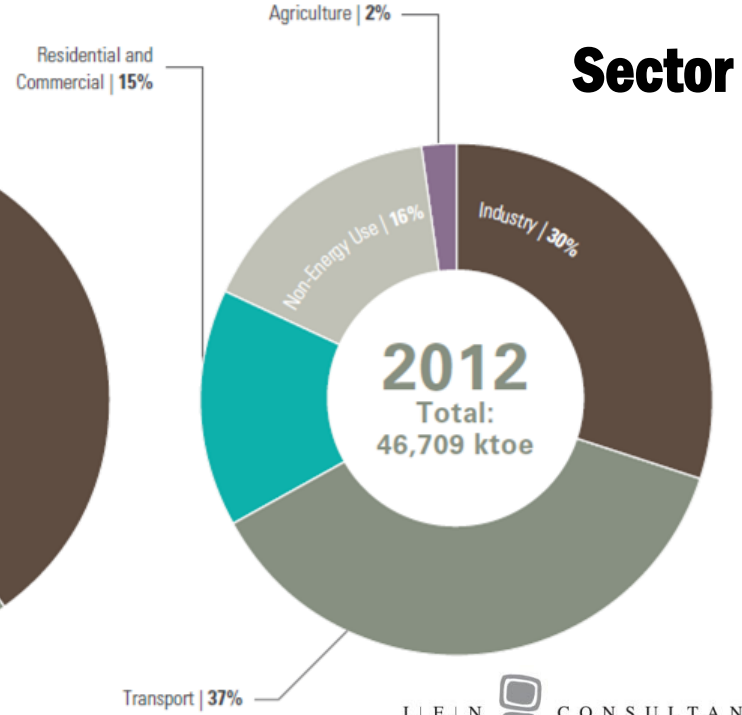
Final Energy Consumption by Fuel Type & Sector

The total energy consumption has increased, and the pattern of usage has also changed from 1992 to 2012. It can be seen that Malaysia appears to have an increased usage of coal; and are heavily reliant on fossil fuels. Electricity & Natural Gas usage has increased as well.



Fuel Type





Sector

Malaysia Energy Statistics Handbook 2014, Suruhanjaya Tenaga
http://meih.st.gov.my/publications
Data Source: National Energy Balance 2012

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The Built Environment & Energy

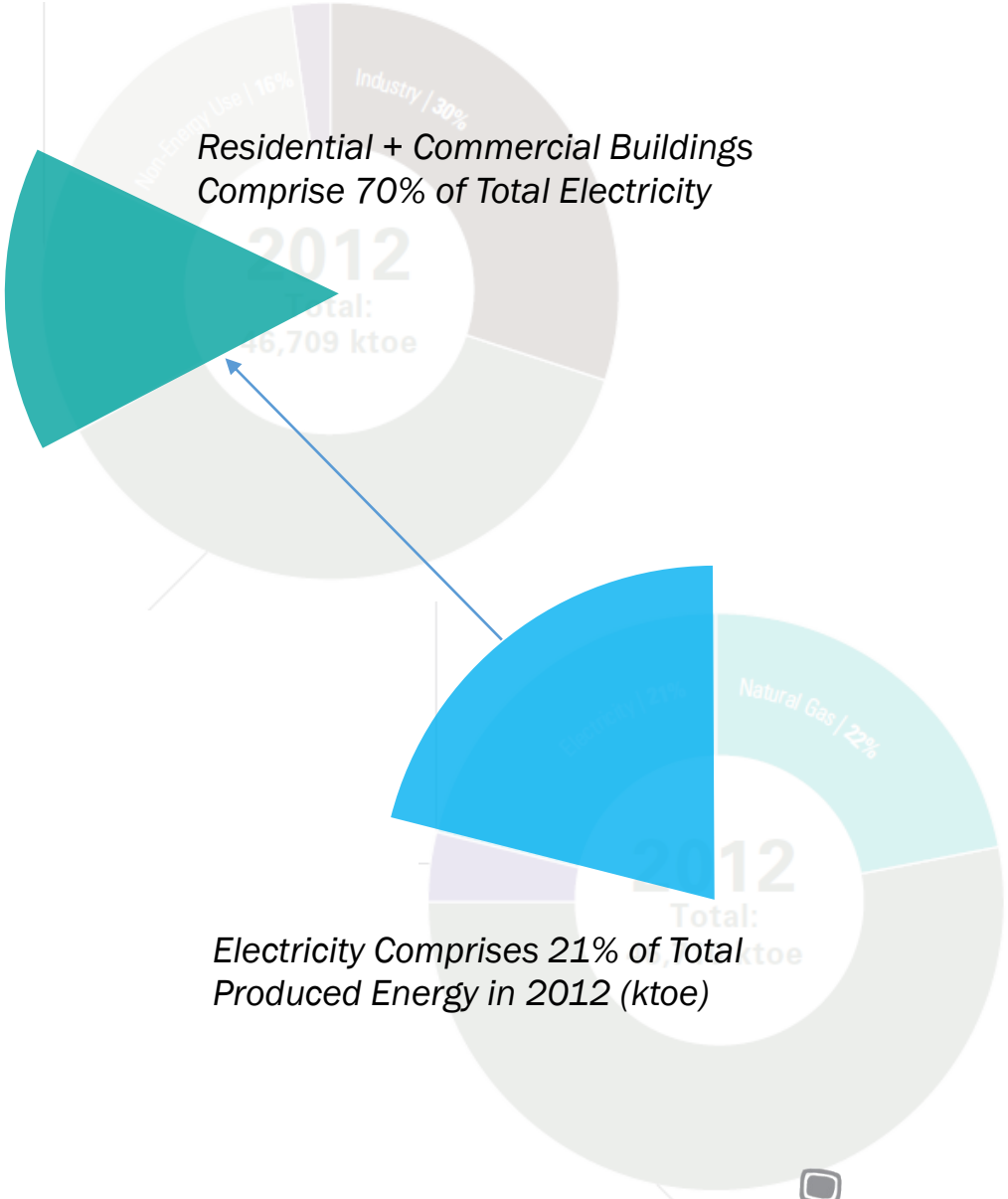
Malaysia Energy Statistics Handbook 2014, Suruhanjaya Tenaga
http://meih.st.gov.my/publications
Data Source: National Energy Balance 2012

"It is estimated that at present, buildings contribute as much as one third of total global greenhouse gas emissions, primarily through the use of fossil fuels during their operational phase"

(IPCC Note on the Built Environment's Carbon Emissions)

In Malaysia (2012 Data);

- 21% of total Final Energy Consumption is electricity
- Approximately 70% of this is used in Residential & Commercial buildings
- However, the process of Energy Generation incurs a 40% loss even before reaching the end user



Residential + Commercial Buildings Comprise 70% of Total Electricity

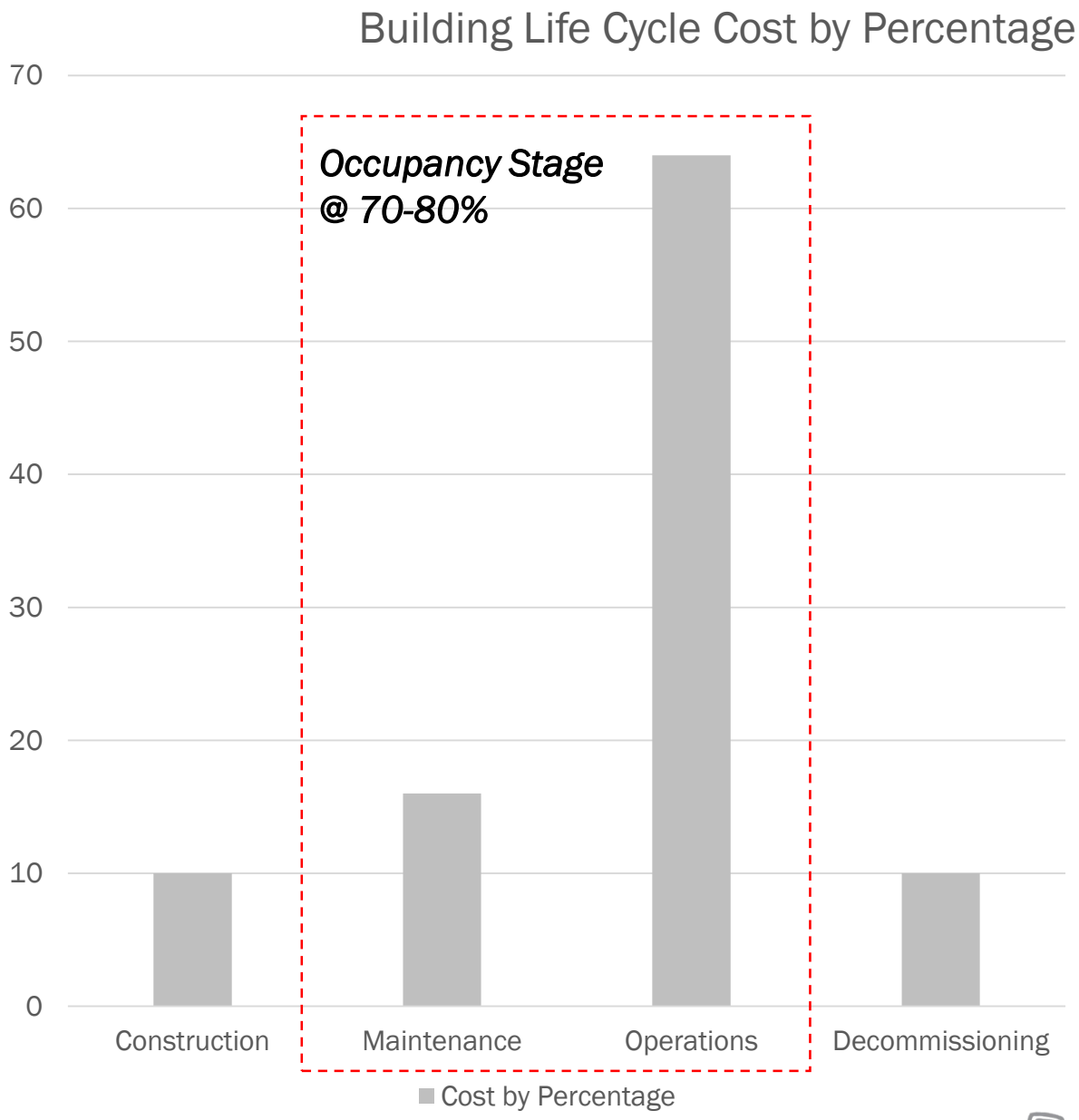
Electricity Comprises 21% of Total Produced Energy in 2012 (ktoe)

http://www.unep.org/sbci/pdfs/SBCI-BCCSummary.pdf
Data Source for Quote: UNEP Webstite

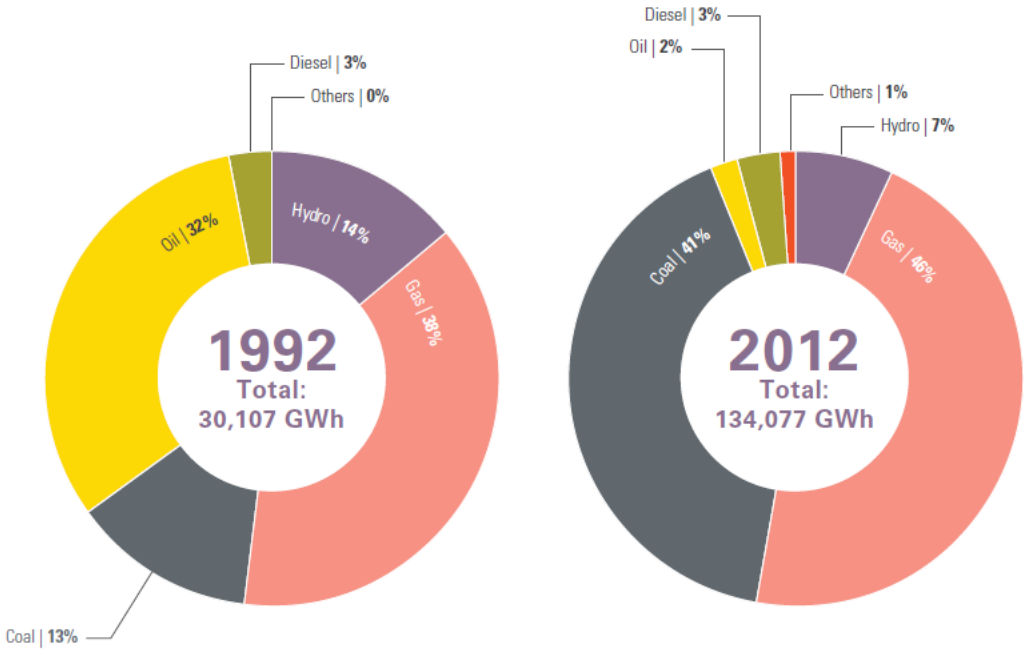
The Building Life Cycle Cost

The table on the right is based on UK Data; and therefore does not directly paint an accurate picture of the Malaysian situation.

It it, however, a good reminder to us about the phase of a building that we often ignore as designers, decision-makers and developers….



THE TRUE COST OF OWNERSHIP *BCIA Website:*
By Steve Harrison, President of the BCIA.
http://buildingservicessummit.co.uk/the-cost-of-ownership/



Electricity Generation Mix in Malaysia

IPCC, 2002-
https://www.ipcc.ch/pdf/special-reports/sroc/Tables/t0305.pdf
2. Climate Registry, 2012 (Emissions Data 2009)-
http://theclimateregistry.org/wp-content/uploads/2015/01/2012-Climate-Registry-Default-Emissions-Factors.pdf
3. Climate Registry, 2016 (Emissions Data 2010/2011) -
https://www.theclimateregistry.org/wp-content/uploads/2014/11/2016-Climate-Registry-Default-Emission-Factors.pdf

1 kWh = 0.47 kg CO_2

1 kWh = 0.64 kg CO_2

1 kWh = 0.69 kg CO_2

Therefore;

Decrease in Energy Demand = Carbon Emission Reductions

LOCAL LOW CARBON INITIATIVES:

Carbon Reduction Initiatives by Federal & Local Authorities

National Strategies for Energy Efficiency

KeTTHA

Several Key Strategies for Energy Efficiencies have been identified:

GreenTech

i. Energy Performance Labels for Appliances

ii. Setting Energy Efficient Standards for Equipment

Pemandu

iii. Guidelines for Sustainable Townships

iv. Enforcing min Efficiency Standards & adoption of Sustainable Rating Tools for Buildings

http://aperc.ieej.or.jp/file/2015/6/19/APEC_Energy_Overview_2014.pdf

Local Council Uptake of LCCF

NO	LOCAL COUNCILS/AGENCIES	LOCATION	YEAR JOINED	AREA (ACRES)	BASELINE DATA (TONNES CO^2/YEAR)	STATUS
1	Majlis Perbandaran Sepang	Cyberjaya	2012	6,960.66	2011: 1,401,350	Ongoing – Phase 3
2	Jabatan Perdana Menteri	RPP, Tasik Kenyir	2012	17.2974	2011: 95.39	Nil – Pilot test for applicability of calculator
3	Majlis Perbandaran Hang Tuah Jaya	Hang Tuah Jaya	2012	627.61	2013: 10,088.87	Achieved reduction of 434.26 tonnes of CO2 by end of 2014. Awarded BP1 Diamond Rating.
4	Majlis Bandaraya Miri	Piasau Utara, Taman Tunku, Shang Garden, Permy Areas	2012	106.68	2013: 11,794.42	Ongoing – Phase 3
5	Universiti Malaya	UM Campus	2012	872.92	2013: 184,528.74	Ongoing – Phase 3
6	Universiti Teknologi Malaysia	UTM Campus	2012	700	2013: 53,486.28	Ongoing – Phase 3
7	Majlis Bandaraya Petaling Jaya	Seksyen 13	2013	218	2013: 283,605.16	Ongoing – Phase 3
8	Majlis Perbandaran Subang Jaya	MPSJ HQ, USJ 5	2014	6.99	2014: 2,311.50	Ongoing – Phase 3
9	Iskandar Regional Development Authority	Rumah Iskandar Malaysia	2014	38.46	2014: 3,154.97	Ongoing – Phase 3
10	Majlis Bandaraya Shah Alam	Seksyen 14	2015	NA	-	Ongoing – Phase 2
11	Majlis Perbandaran Seberang Prai	TBC	2015	NA	-	Ongoing – Phase 2
12	Majlis Bandaraya Ipoh	TBC	2015	NA	-	Ongoing – Phase 2
13	Majlis Perbandaran Kuantan	TBC	2015	NA	-	Ongoing – Phase 2
14	Dewan Bandaraya Kota Kinabalu	TBC	2015	NA	-	Ongoing – Phase 2
15	Dewan Bandaraya Kuching Utara	TBC	2015	NA	-	Ongoing – Phase 2
16	Dewan Bandaraya Kuala Lumpur	TBC	2015	NA	-	Ongoing – Phase 2

* *Phase 2: Baseline development*

http://www.theedgeproperty.com.my/content/vanguard-green-cities-malaysia

LOCAL INITIATIVES

Local Council: *Incentives for Developers*

- **DBKL & MBPP** – Conditions of Planning Approval with Sustainable Building Certification
- **MBSJ** – Increased Plot Ratio
- **MBPJ** – Decreased Plot Ratio & Stringency for New Development areas

MBPJ

JADUAL 2 : GARISPANDUAN PEMBERIAN NISBAH PLOT DI KAWASAN SEKSYEN 13 PETALING JAYA. (1 Ogos 2013)

A. Nisbah Plot Dibenarkan : (⅓ daripada plot ratio maksima)

B. Insentif diberikan mengikut criteria seperti berikut :

SEKTOR	KRITERIA	POINT	PENCAPAIAN (%) /	X
1	**MOBILITI** (KEGUNAAN AWAM DILUAR TAPAK PEMBANGUNAN)			
	• Plaza pejalan kaki dan kaki lima berlanskap	2		
	• Tangga bergerak di tempat awam (diluar tapak bangunan)	2		
	• "Travelator"	2		
	• Jejantas / Titian Langit / Jalan Bawah Tanah	4		
	JUMLAH KECIL	10		
2	**KEMUDAHAN AWAM**			
	• Perhentian Bas / teksi dan Lay by	3		
	• Wifi Free kepada Awam	2		
	• "Water Cooler" (PERCUMA)	2		
	• "Bycycle lane" / Facilities	3		
	JUMLAH KECIL	10		
3	**BANGUNAN HIJAU / GREEN BUILDING** (GBI / LEEDS / GREEN MARK ATAU SETARAF DENGANNYA YANG DIIKTIRAF OLEH MAJLIS) (Certifield – 80% / Silver 90% / Gold, Platinum 100%)			
	• Energy Efficiency • Indoor Environment Quality • Sustainable Site Planning & Management • Material & Resources • Water Efficiency • Innovation	30		
	JUMLAH KECIL	30		
4	**INOVASI**			
	• Penyediaan Kawasan Lanskap berfungsi / Taman Awam melebihi keperluan minima (atas tanah) - 16% – 20% - 4 POINT - 21% – 25% - 8 POINT - 26% – 30% - 12POINT - 31% – 35% - 16 POINT - 36% – 40% - 20 POINT	20		
	• Kadar Caj Tempat Letak Kereta mengikut kadar yang ditetapkan MajliS atau lebih rendah.	15		
	JUMLAH KECIL	35		
5	**LOW CARBON CITY FRAMEWORK** (Urban Environment, Urban Tranportation, Urban Infrastructure and Urban Building)			
	• Environment Performance Rating **Carbon Reduction Level** - 1% - 9% : 3 POINT - 10% - 29% : 6 POINT - 30% - 49% : 9 POINT - 50% - 69% : 12 POINT - 70% - 100% : 15 POINT	15		
	JUMLAH KECIL	15		
	JUMLAH KESELURUHAN	100		

Catatan :

Garispanduan Pemberian Nisbah Plot ini tertakluk kepada pematuhan pra-syarat pembaikan infrastruktur berdasarkan Kajian Impak Lalulintas dan keupayaan untuk menampung serta akujanji secara sukarela memberi sumbangan kepada pembangunan infrastruktur.

MPSJ

Garis Panduan Kriteria Nisbah Plot Pembangunan Perniagaan Bercampur Berasaskan TOD

SEKTOR	KRITERIA	SKOR	PENCAPAIAN (%) /	X
1	**PENYEDIAAN KEMUDAHAN PEJALAN KAKI**			
	• Laluan Pejalan Kaki (Berbumbung / Berlandskap)	4		
	• Jejantas / Jambatan antara bangunan	3		
	• Eskalator / Travelator dari kawasan awam ke bangunan dan antara bangunan	2		
	• Laluan Bawah Tanah dari kawasan awam ke bangunan dan antara bangunan	2		
	JUMLAH KECIL	11		
2	**KEMUDAHAN AWAM SOKONGAN**			
	• Perhentian bas, teksi, laluan susur keluar dan tempat letak bas dan teksi	4		
	• Elemen Kemudahan OKU a. Ramp b. Laluan pejalan kaki beserta *tactile* c. Lampu isyarat mesra OKU d. TLK mesra OKU e. Lif mesra OKU f. Tandas mesra OKU ** minimum 5 elemen*	2		
	• Elemen Bandar Selamat a. Tempat letak motosikal / basikal berkunci b. Penggera keselamatan c. CCTV d. Cermin keselamatan e. Pencahayaan di kawasan terlindung f. Pengasingan laluan pejalan kaki dengan laluan bermotor ** minimum 5 elemen*	2		
	• Sumbangan Pembinaan Dewan Awam	5		
	• 'Water Cooler'	2		
	• Wifi Free	2		
	• Laluan Basikal & kemudahan tempat letak basikal berkunci	2		
	JUMLAH KECIL	19		
	** ***LOW CARBON CITIES FRAMEWORK RATING***	35	/	X
	- *Outstanding > 90 %* = 35			
	- *Excelent >80 % - 89 %* = 30			
	- *Very Good > 70%-79%* = 25			
	- *Good > 60 % - 69%* = 20			
	- *Poor > 50 % - 59 %* = 15			
	- *Unclassified > 50 %* = 10			
	GREEN BUILDING RATING	20		
	- *Certified* = 10			
	- *Silver* = 15			
	- *Gold* = 20			
	- *Platinum* = 20			
	IMEJ BANDAR			
	Pelan landskap yang mengandungi sculpture / arca dan lain-lain rekabentuk landskap kejur yang kreatif dan inovatif	3		
6	*Kadar Caj Tempat Letak Kereta* mengikut kadar yang ditetapkan Majlis atau lebih rendah di bangunan *Park n Ride*	2		
7	*Penyediaan Rumah Selangorku* sebahagian daripada pangsapuri perkhidmatan komersial	10		
	JUMLAH KECIL	15		
	JUMLAH KESELURUHAN	100		

Nota :
/ : Disediakan
X : Tidak disediakan

** Pemarkahan bagi Low Carbon Cities Framework Rating akan diberikan oleh :

Malaysian Green Technology Corporation
No.2, Jalan 9/10
Persiaran Usahawan, Seksyen 9
43650 Bandar Baru Bangi
Selangor Darul Ehsan
Tel: 03-8921 0800
Fax: 03-8921 0801 / 0802

PEMARKAHAN UNTUK PEMBERIAN BILANGAN NISBAH PLOT

60 % -69 %	-	1 : 4
70 % - 79 %	-	1 : 5
80 % - 89 %	-	1 : 6
90% - 95 %	-	1 : 7
96 % - 100 %	-	1 : 8 (MAXIMUM)

PENGESAHAN PEMAJU / PEMILIK TANAH

.....
Tandatangan Pemaju
& Cop Rasmi Syarikat

Nama : .....

No. K/P : .....

No. Telefon / Faks : .....

Email : .....

UNTUK KEGUNAAN MAJLIS SAHAJA

Disemak oleh : .....

Tandatangan : ..... Tarikh : .....

Disahkan oleh : .....

Tandatangan : ..... Tarikh : .....

COLLABORATIVE LOW CARBON INITIATIVES

Carbon Trust's Low Carbon Cities Malaysia Programme

www.lowcarboncities.com

LOW CARBON CITIES

Programme aims

- Reducing emissions to tackle climate change by enabling city government leadership
- Assess and reduce climate change risks in Greater Kuala Lumpur
- Saving money for the municipalities and citizens
- Improving liveability in Greater Kuala Lumpur
- Fostering relationships and trade links between the UK and Malaysia
- Programme is funded by the UK Government Prosperity Fund

Foreign & Commonwealth Office

LOW CARBON CITIES

Overview of low carbon cities methodology

CARBON TRUST

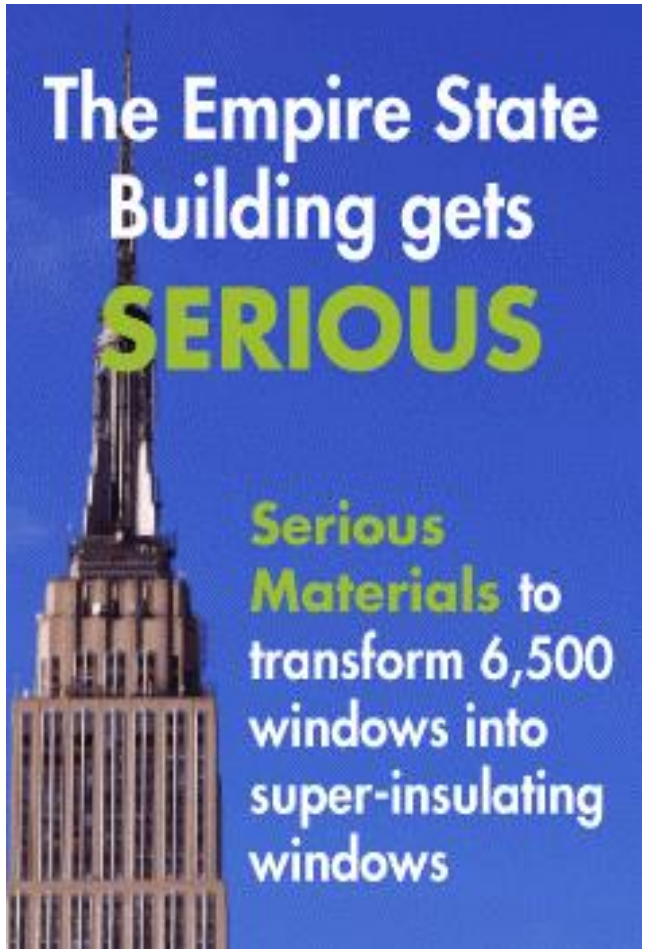
1 Mobilise stakeholders	2 Measure inventory	3 Identify opportunities	4 Develop strategy	5 Implement and review
› Identify stakeholders › Build team › Assign responsibilities	› Gather data for municipal estate and city › Report in line with GPC › Forecast costs › Set targets	› Identify and prioritise opportunities › Quantify savings › Develop business case	› Agree implement-action plan › Establish governance	› Implement initiatives › Review performance › Report on progress

FOCUS FOR URBAN AREA

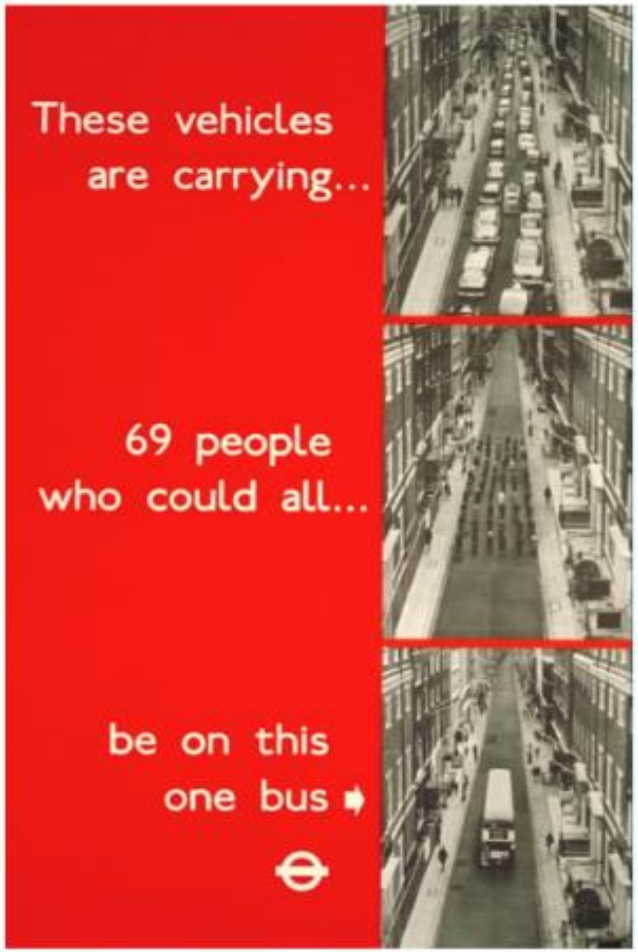
Mitigation Technologies

Where to focus?

CARBON TRUST



Buildings



Transport

AIDING NATIONAL TARGETS

And linking to PEMANDU Greater KL NKEA

CARBON TRUST

LEGEND Operational Work In Progress Not Started

Greater Kuala Lumpur/ Klang Valley

No	EPPs	2020 GNI (millions)	Jobs	Location	Status
EPP 1	Attracting 100 Of the World's Most Dynamic Firms	41,440.5	234,001	Kuala Lumpur, Selangor	
EPP 2	Attracting Internal and External Talent	118,212.1	560	Kuala Lumpur, Selangor	
EPP 3	Connecting KL to Singapore Via a High Speed Rail System	6,223.8	28,700	Kuala Lumpur, Selangor	
EPP 4	Building an Integrated Urban Mass Rapid Transit System	24,630.28	20,000	Kuala Lumpur, Selangor	
EPP 5	Revitalising the Klang and Gombak Rivers into a Heritage and Commercial Centre	4,280.5	17,041	Kuala Lumpur, Selangor	
EPP 6	Greening Greater Kuala Lumpur to Ensure Residents Enjoy Sufficient Green Space	991.5	2,817	Kuala Lumpur, Selangor	
EPP 7	Creating Iconic Places and Attractions	460	13,500	Kuala Lumpur, Selangor	
EPP 8	Creating a Comprehensive Pedestrian Network	6.4	279	Kuala Lumpur, Selangor	
EPP 9	Developing an Efficient Solid Waste Management System	156.5	N/A	Kuala Lumpur, Selangor	

Greater Kuala Lumpur/Klang Valley

Aerial view of the MRT Semantan Portal in February 2013 with parts of the Earth Pressure Balance Tunnel Boring Machine (covered in green tarpaulin) delivered on site

As the capital and commercial heart of the country, the Greater Kuala Lumpur (KL)/Klang Valley NKEA represents a crucial component in the plan to transform Malaysia into a high-income nation by 2020. The overall aim is to transform the region into a world-class metropolis that will boast top standards in every area from business infrastructure to liveability.

By 2020, the NKEA is projected to create 300,000 new jobs through the implementation of nine Entry Point Projects (EPPs).

Cost Saving | **Air Quality** | **Job Creation** | **Thermal Comfort**

City Brand | **Energy Security** | **Consumer Education** | **Technology Acceleration**

Joining up the work to accelerate green growth and carbon reduction in Greater KL

COLLABORATIONS: *Carbon Trust & Local Councils*

AMPANG JAYA SELANGOR

Local Council Collaboration

CARBON TRUST

Majlis Perbandaran Ampang Jaya, MPAJ *from mid-2016*

- Establishing both **municipal** and **territorial** estate carbon inventories
- Agreeing reduction targets and prioritising projects to meet targets
- Establishing financial business case for action
- Linking into wider KL sustainability agenda

Portal Rasmi MAJLIS PERBANDARAN AMPANG JAYA

Dewan Bandaraya Kuala Lumpur, DBKL *from mid-2016*

- Develop **municipal** estate inventory and energy reduction plan/ target
- Develop the financial business case for action
- Link our work with the LCS Blueprint project
- Drive forwards a sustainable, liveable Greater KL

Portal Rasmi DEWAN BANDARAYA KUALA LUMPUR
Agensi Kementerian Wilayah Persekutuan

Majlis Bandaraya Petaling Jaya, MBPJ *from 2014*

- *On-going project: Case Study*

Portal Rasmi MAJLIS BANDARAYA PETALING JAYA

PETALING JAYA SELANGOR

MBPJ and the city of Petaling Jaya

CARBON TRUST

Achieved so far:

- Established both **municipal** and **territorial** estate carbon inventories
- *Municipal*
  - Inventory and project register for MBPJ estate and operations
  - 25% carbon reduction target, saving 3,000 tCO2 and RM3.7m per year
- *Territorial*
  - Wider city carbon inventory completed
  - Cost effective initiatives to cut carbon by 30% by 2030 identified- covering residential, commercial, industrial and transport, and renewable energy

Going forward:

- Select one or more key projects for detailed financial and technical feasibility
- Support MBPJ in first steps towards procuring project
- Linking to wider Greater KL sustainability project

Portal Rasmi
MAJLIS BANDARAYA PETALING JAYA

PETALING JAYA SELANGOR

Petaling Jaya Case Study - *Buildings*

CARBON TRUST

Objective

Residential Emissions: reduce by 4 kilo tCO2/yr

Action: Property tax rebate scheme

Action: Residential energy audits

Objective

Industrial & Commercial: reduce emissions by 33 kilo tCO2/yr

Action: Energy management and monitoring & targeting

Action: LED lighting

Action: Energy efficient motors & drives

Objective

New Development: reduce emissions by 15 kilo tCO2/yr

Action: Continue to support and promote Green building Index lead reductions

Objective

Renewable Energy: target 10% generation against 2030 BAU forecast

Action: Install Solar PV to generate 10% of 2030 forecasted requirements

PETALING JAYA SELANGOR

Petaling Jaya Case Study – *Transport*

CARBON TRUST

Objective

Private Vehicle Emissions: reduce by 30 kilo tCO2/yr

Action: increase the size of bus fleet

Action: Encourage public transport use through better links and scaled up Park N Ride scheme

Objective

Hybrid Vehicles

Action: encourage uptake through free parking scheme

Objective

Electric Vehicles

Action: Install supporting infrastructure via government assistance and target 1000 EVs by 2020

Objective

Cycling & Pedestrians

Action: Master plan for Main Lane PJ City Cycling Project

Other programme linkages

- Low Carbon Cities Framework and Assessment System, Malaysia
- World Bank City Climate Planner qualification
- World Resources Institute GHG Protocol for Community Scale Emissions (GPC)
- UN SE4ALL accelerators and city climate planning guidance
- Reporting platforms such as the Compact of Mayors
- IEN Consultants
- Sayers and Partners Consultants
- CETDEM Consultants

FEASIBILITY FOR DEVELOPERS?

Designing for Carbon Emissions Reduction in Buildings

KKR2: *GBI Platinum*

MENARA KERJA RAYA (KKR2)

GBI Platinum
Final certification

Sustainable Design Strategies & Impacts

Menara Kerja Raya (KKR2), Kuala Lumpur, Malaysia

WATER STRATEGIES

- Water Efficient Features
- Waste Water Recycling
- Rainwater Harvesting
- Condensate Water Harvesting

ENERGY STRATEGIES

Air Conditioning Strategies

- Variable Fan Speed + Heat Recovery
- High Efficiency Chilled Water Plant

Lighting Strategies

- High Performance Glazing
- Daylight + Motion Sensors
- Automated lighting strategy
- Efficient Lighting Design & Selection

Renewable Energy

- PV Panels– 2% of Energy Demand

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MENARA KERJA RAYA (KKR2)

Sustainable Design: *Comparison*

Menara Kerja Raya (KKR2), Kuala Lumpur, Malaysia

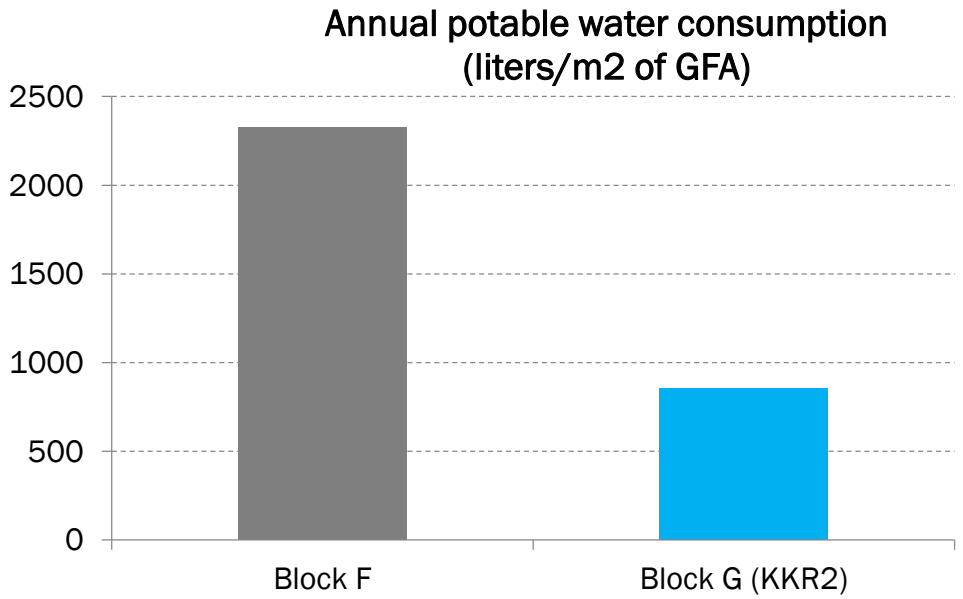
GBI Platinum
Final certification

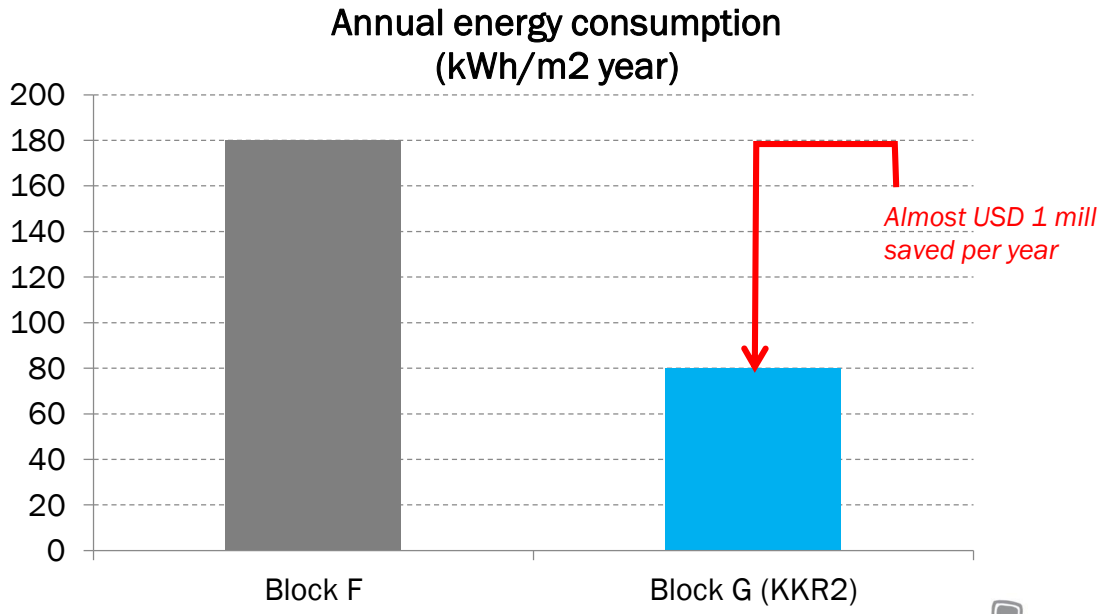
Block F
(JKR)

Key Data:
GFA: 25,500 m2
Year Completed: 1977

Block G
(KKR2)

Key Data:
GFA: 52,200 m2
Year Completed: 2010





IMPACT

Building Energy Intensity = 90 kWh /m2 per year
Renewable Energy = 2% of total building energy demand
Water Consumption = 70% reduction in water use

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ST Diamond Building: *Green Mark & GBI Platinum*

ST DIAMOND BUILDING

Sustainable Design Strategies & Impacts

Suruhanjaya Tenaga (ST Diamond), Putrajaya, Malaysia

Green Mark & GBI Platinum
Final Certification
ASEAN Energy Award
Winner of 2012

DESIGN STRATEGIES

Building Shape & Passive Features

- Self Shading Façade
- Atrium Day Lighting
- Diffused Skylight-Wells
- Reflective Light Shelves + Sill

ENERGY STRATEGIES

Air Conditioning Strategies

- Chilled Slab cooling
- Night-time thermal loading

Lighting Strategies

- Daylight Sensors
- Efficient Lighting Design & Selection

Renewable Energy

- PV Panels – 10% of Building Energy Demand

WATER STRATEGIES

- Water Efficient Features
- Waste Water Recycling
- Rainwater Harvesting
- Condensate Water Recovery

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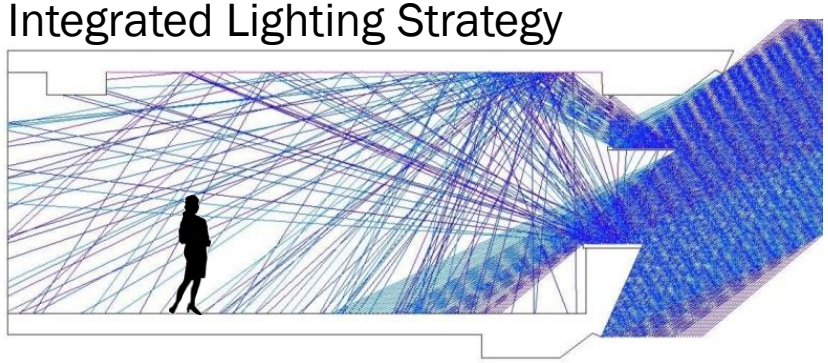
ST DIAMOND BUILDING

Sustainable Design: *Results*

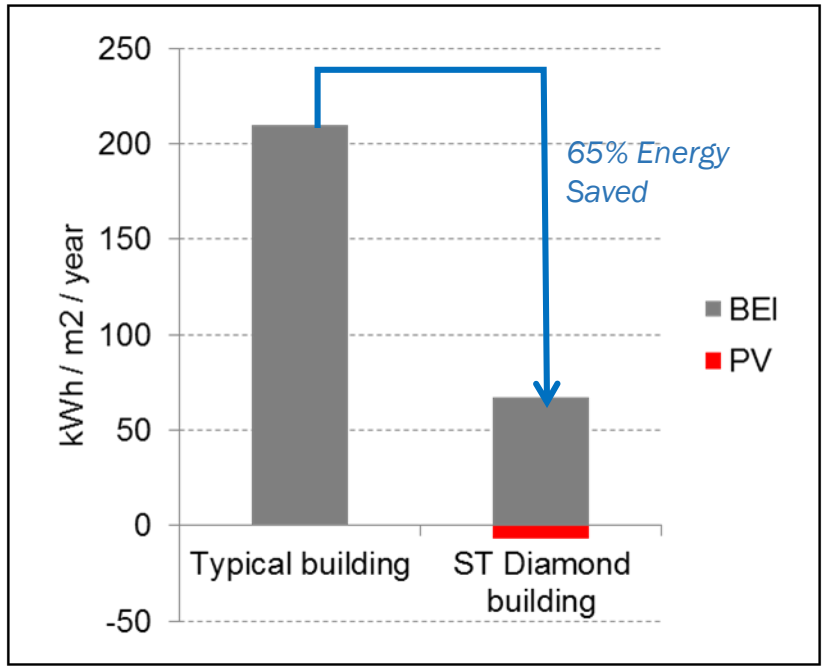
Suruhanjaya Tenaga (ST Diamond), Putrajaya, Malaysia

Green Mark & GBI Platinum
Final Certification
ASEAN Energy Award
Winner of 2012

Integrated Lighting Strategy

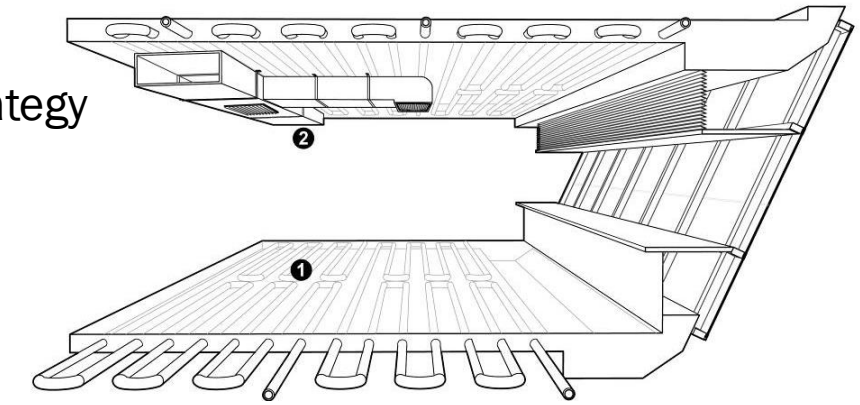


- Light Shelf
- Window Sill
- Daylight Sensors
- Efficient Lights



Integrated Cooling Strategy

- Self-shaded Façade
- Chilled Slabs
- Efficient HVAC System



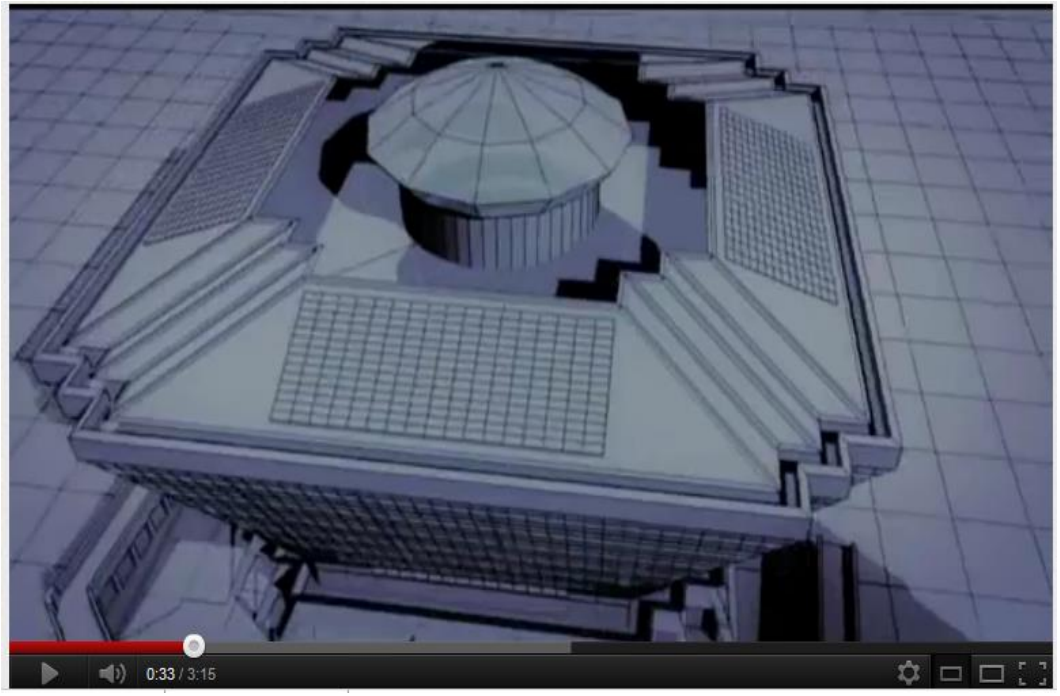
Key Data:

GFA: 14,000 m2
Year of Completion: 2010
Additional EE Cost: 3.2%
Payback Period: 3.2 years

IMPACT

Building Energy Intensity = 65 kWh / m2 per year
Renewable Energy = 10% of total building energy demand
Water Consumption = 65% reduction in water use

3-minute video



Sustainable Features of ST Diamond Building.
Available at YouTube:
http://www.youtube.com/watch?v=3H_sXCtDayc

OFFICE RETROFIT

Energy Efficiency & Conservation Clearing House Ind’sia (EECCHI)

EECCHI OFFICE (RETROFIT)

EECCHI Office Retrofit *Jakarta*

Retrofit Changes on one level:

Removal of:-

- Suspended Ceiling Boards
- Vertical Blinds
- T8 Lights
- Old HVAC System

Addition of:-

- External Mirrored Light Shelf
- Venetian Blinds with Reflector
- Additional Glass Pane
- T5 & LED Lights
- Daylight & Occupancy Sensors
- Ensuring Air-tight building envelope

HVAC System:-

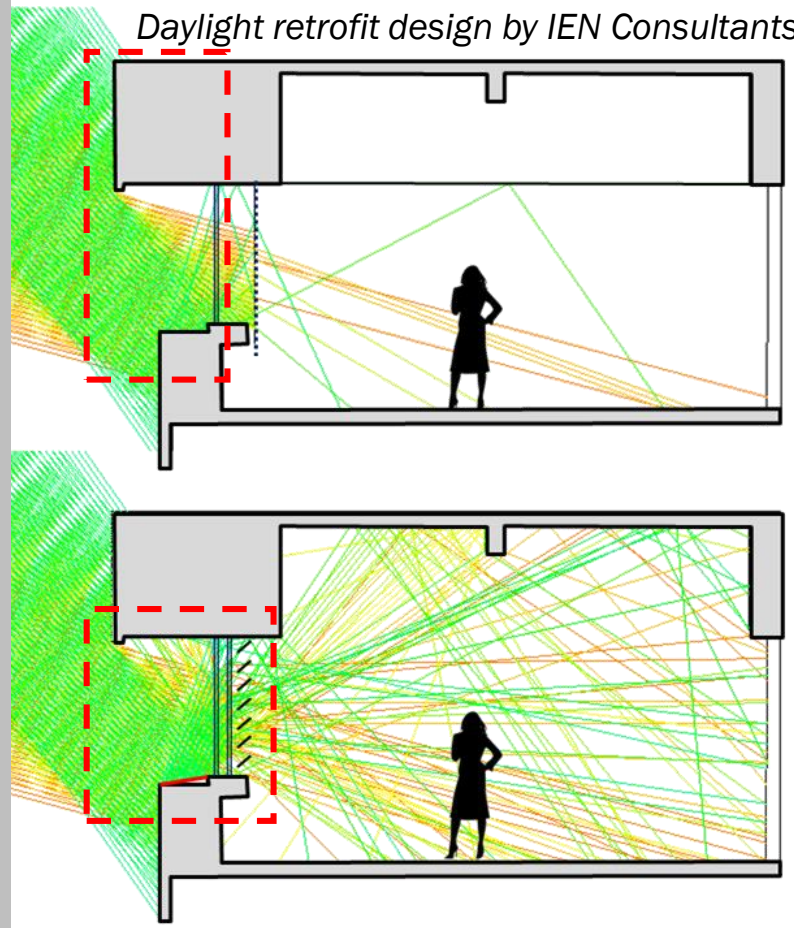
- Variable Refrigerant Flow (VRF)
- CO2 Sensor to regulate FAI

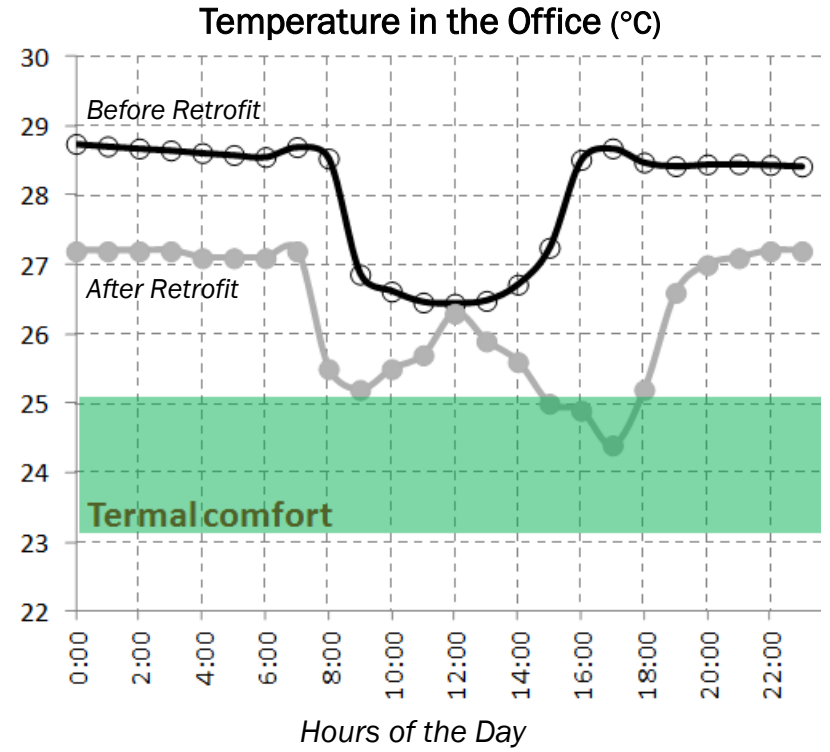
Resulting Improvements of the EECCHI Office Retrofit

1. Building Envelope- Prevention of discomforts

- Acoustic improvements
- Air Leakage prevention
- Insulation and heat transfer reduction

Daylight retrofit design by IEN Consultants





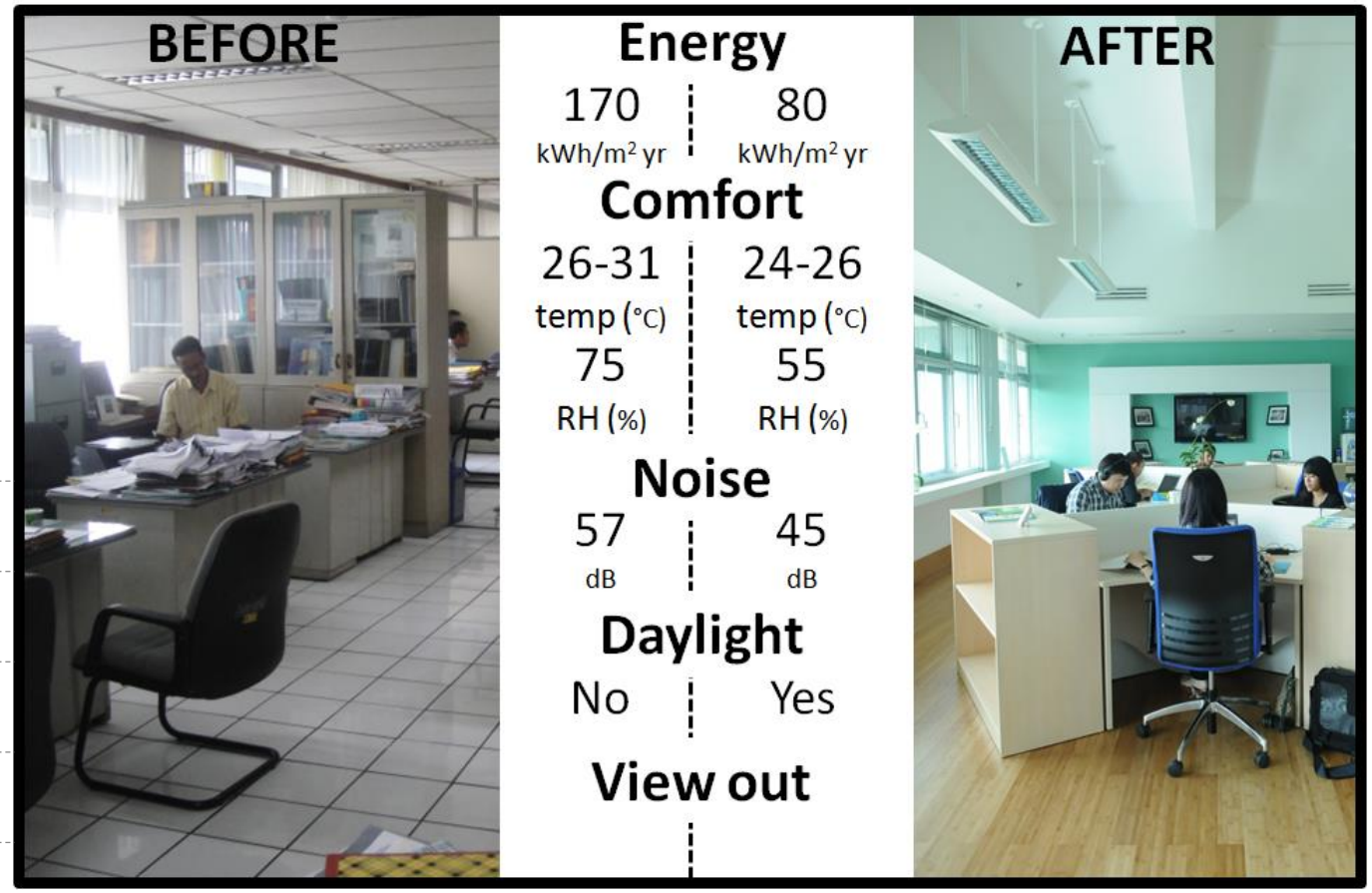
2. Lighting Strategy- Maximise daylight potential

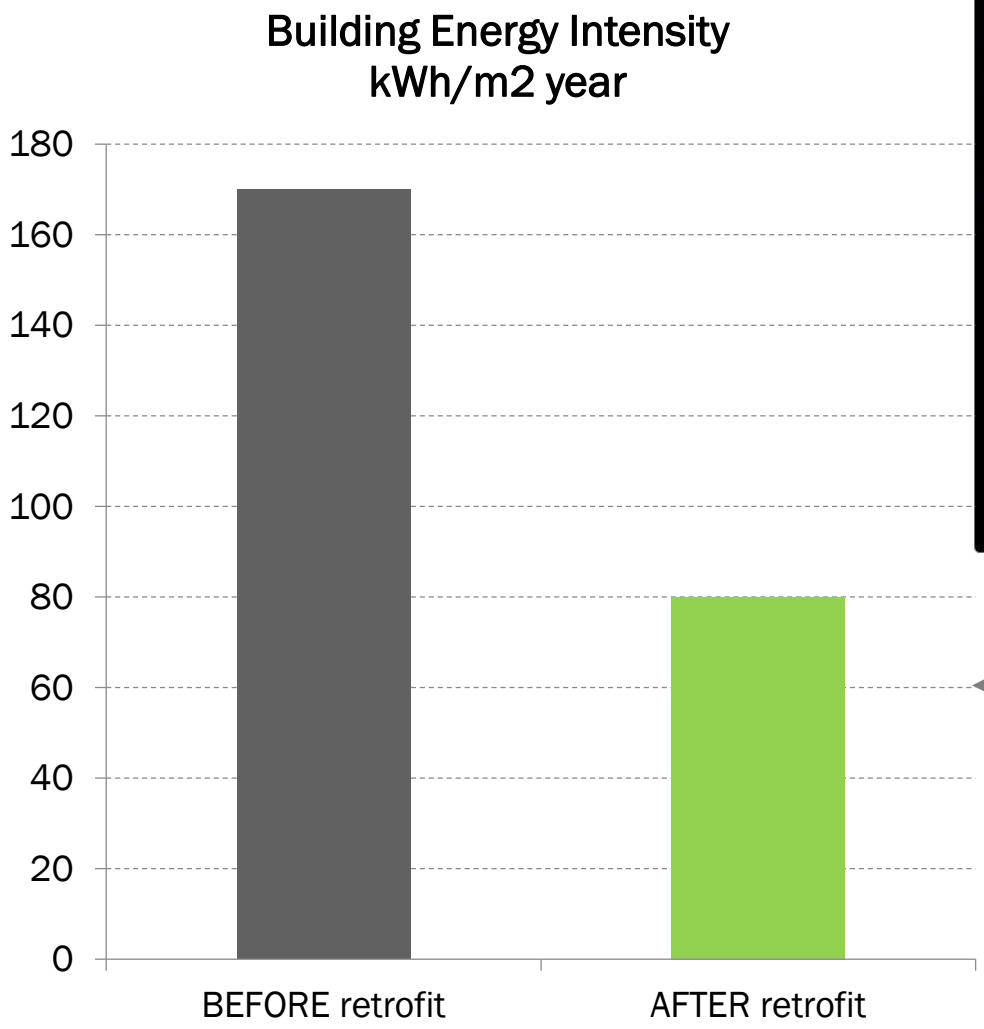
- Increased distribution of daylight- reflectivity, higher ceiling & blinds
- Sensors to control artificial lights – sensors & efficient light

3. HVAC System- Occupancy based

- Occupant based cooling and fresh air intake

RESULTS: EECCHI OFFICE





53% Measured Energy Savings!

53% Reduction in Carbon Emissions

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THE FINANCIAL CASE

RETURN OF INVESTMENTS

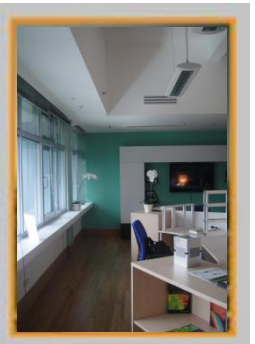
Energy Efficient Buildings with Good Payback time

Case studies from the South East Asian countries

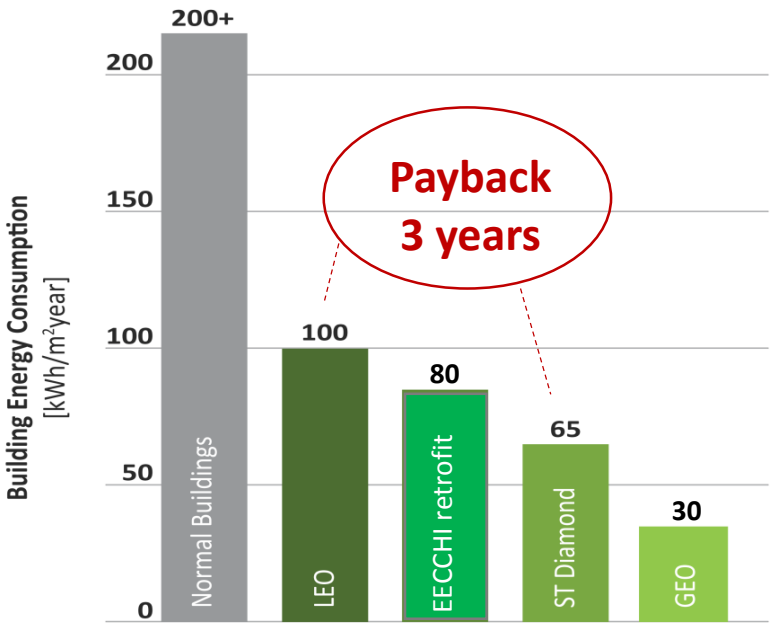
LEO Building

GEO Building

ST Diamond Building



EECCHI retrofit



Energy Consumption
of
Green Office Buildings

Measured data for New and Retrofitted Buildings
by IEN Consultants

Completed year:	2004	2011	2010	2007

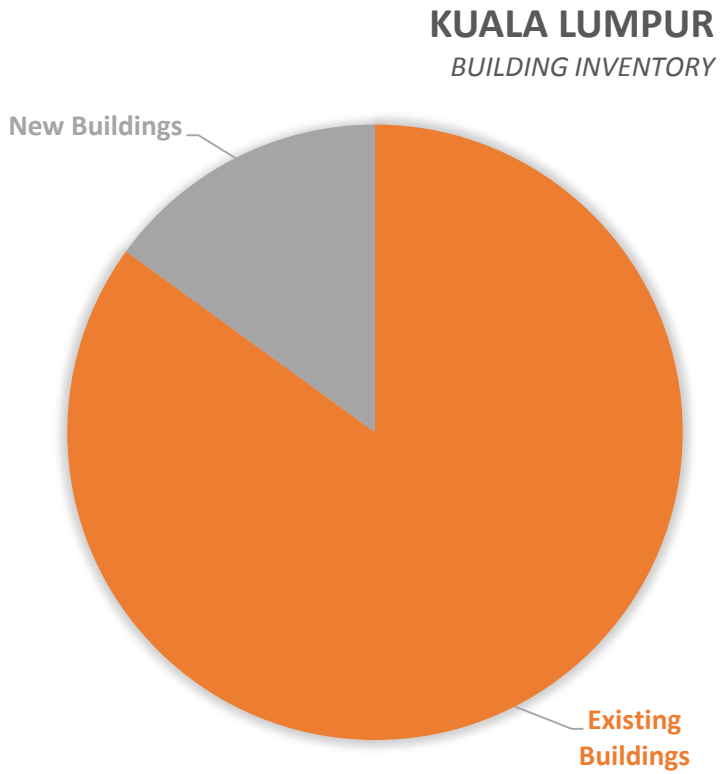
CONCLUSION

CONCLUSION

Where do we stand?

- **Building Stock:**
  - i. New Buildings
  - ii. Existing Buildings

- **Current Targets:**
  - i. Planning Approval Conditions
  - ii. Benefits for achieving Targets
  - iii. Local Councils not stringent enough



KL Draft City Plan data on KL Building Stock
http://new.greenbuildingindex.org/resources
Data Source: GBI Website- Resources

CONCLUSION

Moving Forward- Decreasing Carbon Emissions

Leadership:

- Councils taking action by setting targets:-
  i. Building stock
  ii. Infrastructure
  iii. Transportation fleet
  iv. Energy source
- Implement a framework on achieving these targets
- Ensuring benefits for achieving beyond targets, and/or;
- Implication for failure of achieving targets are established

*(2B) For the purposes of subsection (2A), development for the construction of major infrastructure or utility shall include—

(*a*) national infrastructure works such as airports, seaports, railway lines and highways; and

(*b*) national utility works such as the erection of dams, main power stations and toxic waste disposal sites.

(3) After taking into consideration the matters specified in subsection (2), the local planning authority may, subject to subsection (4), grant planning permission either absolutely or subject to such conditions as it thinks fit to impose, or refuse to grant planning permission.

Excerpt from Act 127 Town and Country Planning Act 1976- Section 22 (3)

Governance:

- Increase stringency of Planning Approval Conditions
- Implement mandatory energy reporting schemes
- Establish strategies to benefit Existing Building energy use decrease such as tax initiatives
- Amendment to Planning Laws and/or Building by-laws

Power to make rules

64. (1) The Commissioner may with the approval of the Minister make rules generally for the better carrying out of the provisions of this Act.

Excerpt from Federal Territory Planning Act 1982 Section 64 (1)

CONCLUSION

National Targets for Carbon Emission Reductions

At COP 15 in Copenhagen, Prime Minister YAB Dato' Sri Mohd Najib Tun Abdul Razak announced that Malaysia would voluntarily reduce its emissions ~~intensity of GDP by up to 40% based on 2005 levels by~~ 2020.

Set higher reduction of emissions overall; not only per capita and set a local & global example

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