

# Green Airports KLIA and klia2

**ICAO International Aviation and Environment Seminar**

**Presented by: Somita Raj**

**Senior Manager, Transformation Management Office,  
Malaysia Airports Holdings Berhad**

**28<sup>th</sup> to 29<sup>th</sup> October 2014 , Kuala Lumpur Concorde**



# Agenda for the Day

**1**

**GLOBAL INDUSTRY TARGETS**

**2**

**OUR NATIONAL INDICATORS**

**3**

**MALAYSIA AIRPORTS COMMITMENT**

**4**

**KLIA GOING GREEN SINCE 1998**

**5**

**NOW klia2 A GREEN BUILDING**

**6**

**OUR ENVIRONMENTAL PLANS MOVING FORWARD**

# GLOBAL INDUSTRY TARGETS

## 2010

- 1.5% improvement in fuel efficiency
- Working towards carbon neutral growth

## 2020

- Cap emissions from 2020 for carbon neutral growth
- Implementation of Global Sectoral approach

## 2050

- 50% reduction in net CO2 emissions over 2005 levels

“Under ICAO’s leadership, aviation has produced the first, and to date, only globally-harmonized agreement designed to address climate change on a global basis from a specific sector and ICAO is in the best position to effectively and systematically address the impact of international aircraft emissions on climate change.”

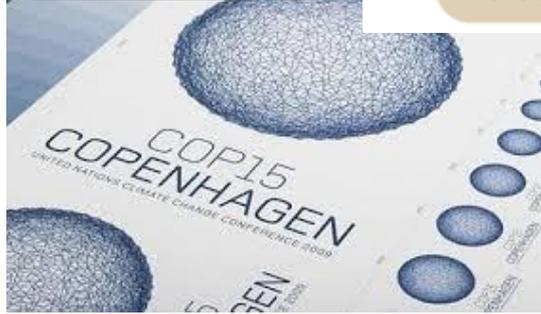
***ICAO President Roberto Kobeh González***

# OUR NATIONAL INDICATORS

## 2009, COPENHAGEN, DENMARK



17th December 2009 – Copenhagen, Denmark  
*"I would also like to announce here in Copenhagen that Malaysia is adopting an indicator of a voluntary reduction of up to 40% in terms of emission intensity of GDP by the year 2020 compared to 2005 levels. This indicator is conditional on receiving the transfer of technology and finance of adequate and effective levels from our Annex I partners..."*



MALAYSIA

### Malaysia on track to hit carbon emission cut target, Najib tells climate summit

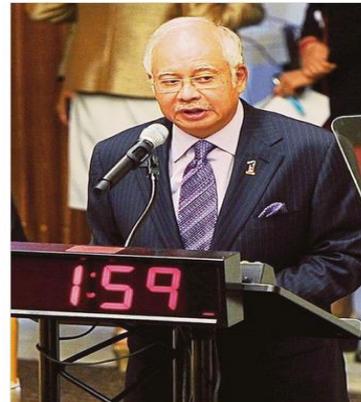
SEPTEMBER 24, 2014

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### NEW STRAITS TIMES ONLINE 'Malaysia committed to 2009 carbon pledge'

BY A JALIL HAMID - 25 SEPTEMBER 2014 @ 8:14 AM



Prime Minister Datuk Seri Najib Razak giving his speech at the United Nations summit on climate change in New York yesterday. Bernama pic

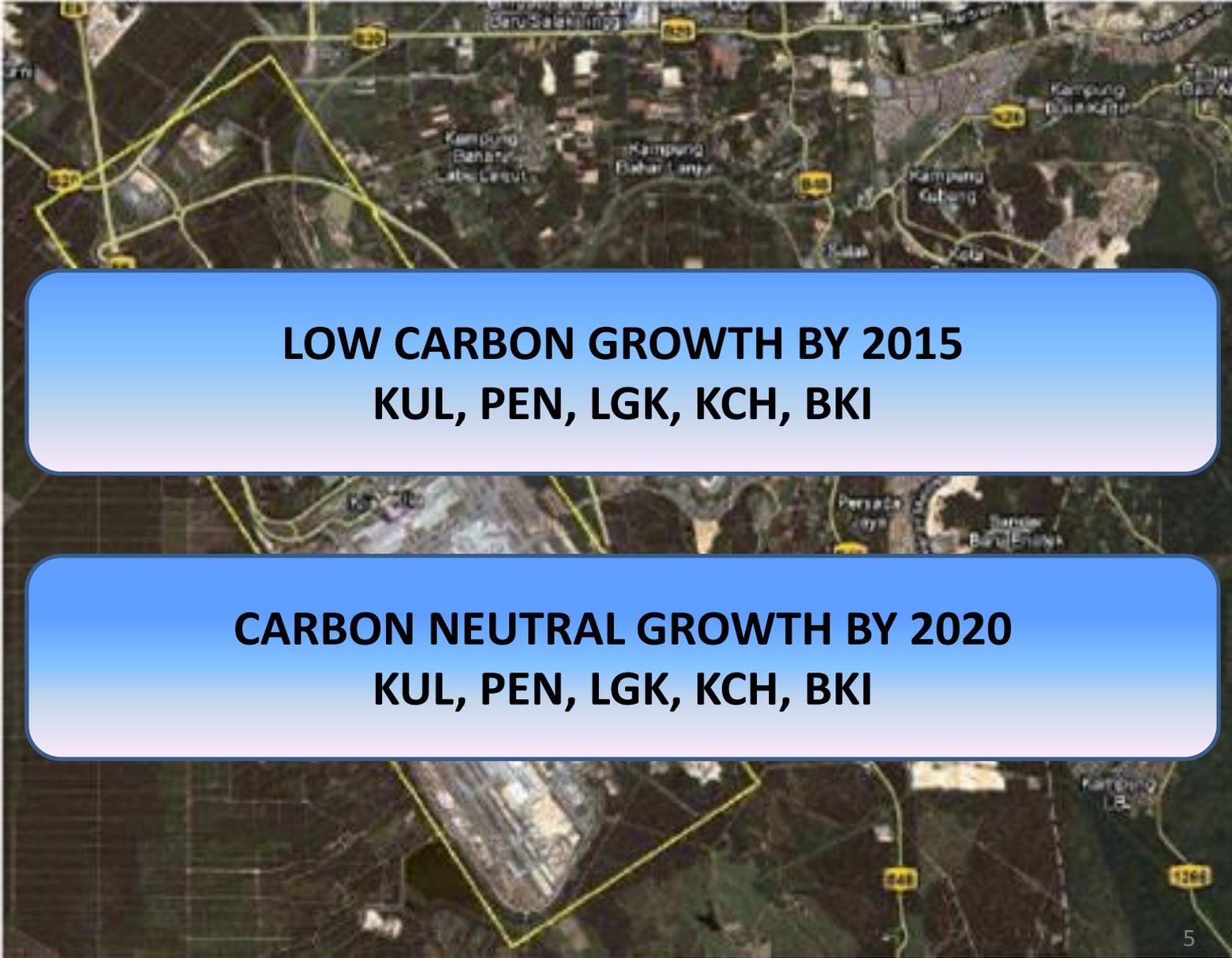


Seri Najib Razak addresses the Climate Summit at the UN headquarters in New York September 23, 2014.

## CLIMATE SUMMIT, UN HEADQUARTERS, NEW YORK, 24<sup>TH</sup> SEPT 2014



# MALAYSIA AIRPORTS COMMITMENT



**LOW CARBON GROWTH BY 2015**  
**KUL, PEN, LGK, KCH, BKI**

**CARBON NEUTRAL GROWTH BY 2020**  
**KUL, PEN, LGK, KCH, BKI**

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# KLIA GOING GREEN SINCE 1998

## ENERGY INITIATIVES



Natural lighting in KLIA terminal building reducing the need for lighting during the day

# KLIA GOING GREEN SINCE 1998

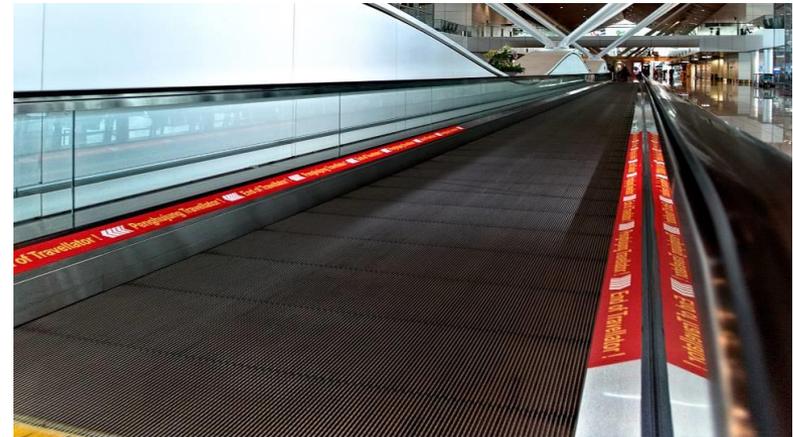
## MORE ENERGY INITIATIVES...



- ENERGY SAVINGS DEVICE (ESD)**
- Average 39% monthly savings in consumption at installed locations
  - Average reduction of 500 CER equivalent per month



Switching off lightings and air-conditioners when not in use



Sensors in lighting, air-conditioner and walkalators

# KLIA GOING GREEN SINCE 1998

## WASTE MANAGEMENT INITIATIVES



Recycling bins at KLIA



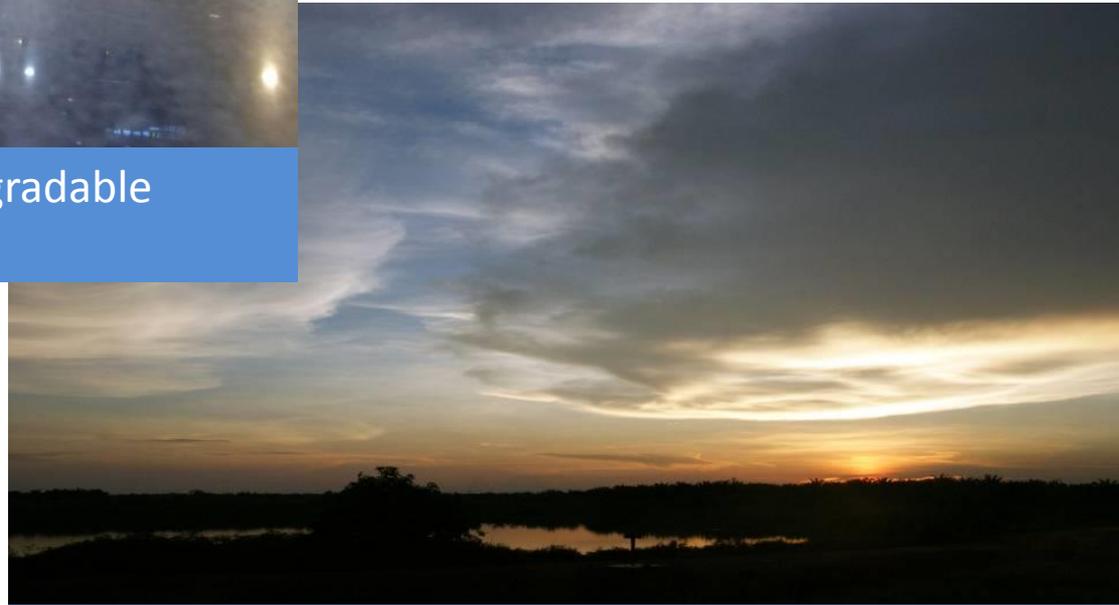
Paperless travel with introduction of self-service kiosk and mobile check-in

# KLIA GOING GREEN SINCE 1998



## WATER MANAGEMENT INITIATIVES

Introduction of mandatory use of biodegradable detergent and cleaning material



Collection of rain water at 2 balancing ponds to allow sediments to settle before being channeled to nearby rivers

# KLIA GOING GREEN SINCE 1998

## 2009 KLIA Carbon Footprint study



Kuala Lumpur International Airport – Carbon Footprint Mapping 2009

The following map shows the study boundary for this study.

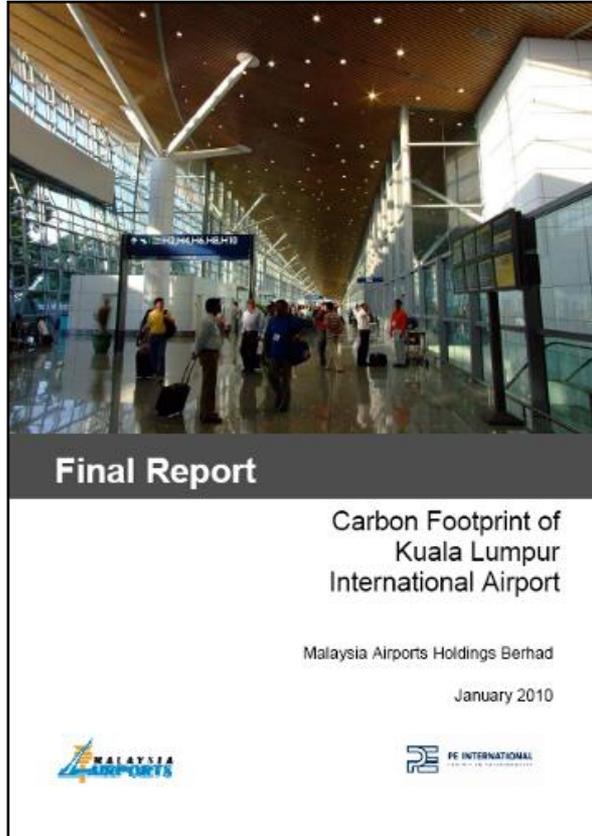


Figure 2 Carbon footprint study boundary (Source from google earth)

**KLIA'S DIRECT EMISSIONS 2008/2009: 96,437 metric tonnes CO<sub>2</sub>-eq p/year**

Methodology: Green House Gas (GHG) Protocol

Verified by: PE International, 2010

# KLIA GOING GREEN SINCE 1998



**BIODIVERSITY AT THE  
HEART OF OUR BUSINESS**

“Airport in a Forest, Forest in an Airport”

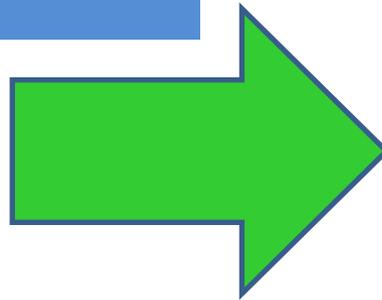


Late 2009, THE KLIA JUNGLE BOARDWALK was developed to offer passenger a refreshing experience of walking through a mini natural forest reserve

# KLIA GOING GREEN SINCE 1998



Launching of Malaysia Airports Sustainability Policy



## Sustainability Report 2009 – To Date



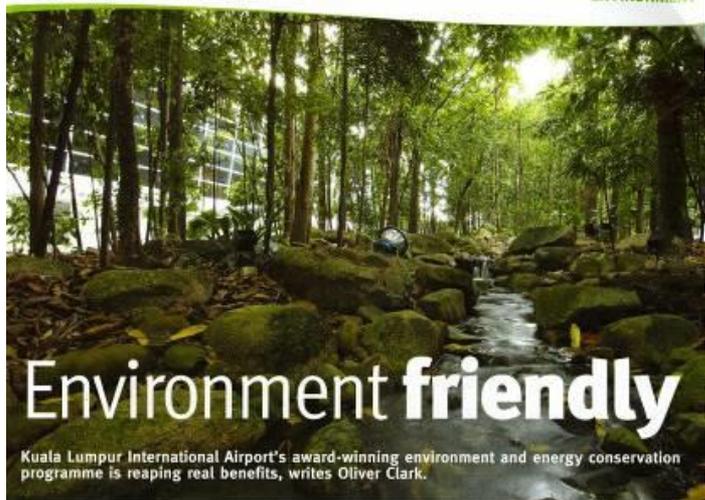
# KLIA GOING GREEN SINCE 1998

Annual GREEN DAY since 2011



# KLIA GOING GREEN SINCE 1998

## Making HEADLINES



### Environment friendly

Kuala Lumpur International Airport's award-winning environment and energy conservation programme is reaping real benefits, writes Oliver Clark.

When the Japanese architect Kisho Kurokawa won the bid to design Kuala Lumpur International Airport (KLIA) in 1990, it was with a vision to make Malaysia's rainforest an integral part of the airport's very structure – to create the first truly green airport.

A founder of the 'Metabolism Movement', an architectural school devoted to the idea that there is a symbiotic relationship between nature and architecture, Kurokawa planned to integrate lush vegetation into the halls and terminal buildings of the new international airport.

KLIA was constructed on 120 kilometres of wasteland under the slogan 'An airport in the forest and a forest in an airport' and half a million trees were transported to the site and planted around the main terminal building.

At the nearby satellite building an enclosed rainforest arboretum, the 'Satellite Forest' – complete with a waterfall – ensures that one of the first things arriving passengers see is a swathe of living greenery.

"A lot of thought has been put into the design of KLIA to incorporate as much of the environment as possible. This brings together nature, technology and human imagination," says Tan Sri Bashir Ahmad, managing director and CEO of Malaysia Airports.

"Take, for example, the roof of the airport's main terminal building. The roof is technologically designed to be flexible enough

to withstand earthquakes, but when you gaze at it from inside it resembles the trunks of a palm tree," he says.

Now, nearly 20 years on, KLIA's officials are continuing the late architect's vision with an environmental programme whose achievements were recognised with Green Globe 21 certification in 2004, the only airport in the world so far to receive the coveted award.

The Green Globe certificate is based on the Agenda 21 principles of sustainable development agreed by 182 heads of state at the United Nations' Rio de Janeiro Earth Summit in 1992, and is awarded for a clear commitment to the continual identification, control and improvement of the environmental and social impact of an organisation's operations.

KLIA has won the award an impressive five years in a row largely thanks to its self-regulating Environmental Management System (EMS), which contains key goals for reducing greenhouse gas emissions, conserving energy supplies and improving planning and land use.

"KLIA is proudly a Green Globe certified airport. In order to maintain this certification year-on-year, one criterion that needs to be met is the demonstration of continuous improvement. Every year Green Globe revises its benchmark criteria for us," enthuses Bashir.

To achieve this, the airport works to seven key green considerations, namely preservation of the natural environment, waste management, energy efficiency, resource management,

ENVIRONMENT



### Welcome the jungle

KLIA beefs up its retail initiative by placing a forest at its heart

WEB TALKING ABOUT WEEKENDER SATURDAY 24 JULY 2009

While conservationists are mauling the aviation industry in the West, Asia is proving that air travel can be more eco-friendly.

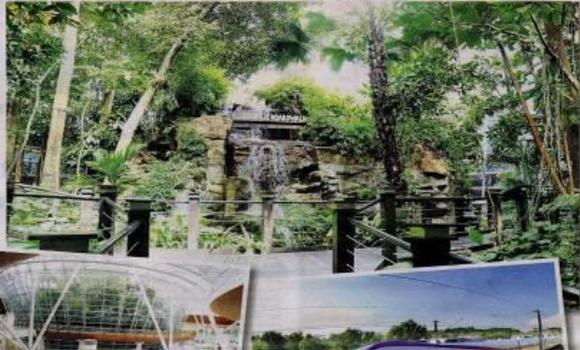
By ANDREW PONNAMPALAM

Conservationists and eco-advocates recently took to the streets to protest against plans for a third runway at London's Heathrow Airport. Citing a host of reasons that include aviation emissions, noise pollution, carbon generation and loss of scenery.

The European Union is strongly in favour of such a project but has been criticised for not having been more forthcoming in discussing plans to limit air travel's carbon emissions from 2011, and recently, an EU member-country coalition of 15 air passenger fees, with a handful of politicians comparing this to the cost of a cigarette or a 'sin tax' for things like tobacco and gambling.

In England, there is even an online group that tries to discourage everybody and anybody from flying. There's a page on the website of a group that says that it is "holding out hope for a better, greener, more sustainable future for our planet" and that it is "committed to short-term solutions that will reduce our carbon footprint and our energy consumption."

### Getting it green



NEW STRAITS TIMES, TUESDAY, OCTOBER 21, 2009

T10 TRAVELTIMES

### Forest in the airport



At the Jungle Boardwalk are (from right) Eraman CEO Umar Bustaman, Malaysia Airports chairman Tan Sri Datuk Dr Aris Othman, Puan Sri Sherina Ari and Malaysia Airports senior general manager commercial services Faizal Khairuddin

The shade has been lifted on what is probably Kuala Lumpur International Airport's best kept secret – its forest reserve in the core of the satellite building.

Visitors to the KLIA Jungle Boardwalk will find a sense of serenity induced by the sound of trickling water as they cross the walkway.

The management has also placed name signages to identify the different trees so that visitors can have a more enriching experience. A circular viewing gallery has also been opened on the

mezzanine level.

MAHB chairman Tan Sri Dr Aris Othman said the project allows the company to make changes to the physical appearance of the shops while adding more variety, brands and choices in the bid to encourage passengers to shop and dine in the airport.

He also said that this is within the company's mission to transform the place so that it will be more than just an airport.

The RM50 million project was completed in four phases over 17 months,

starting from mid-2008 till October this year. Visitors can now get a range of facilities, from duty free outlets to lounges and refueling services.

The layout of the area has also been enhanced through the project and allows greater ease of movement for travellers from one part of the satellite building to the other.

Prime Minister's official residence at 10, Downing Street in London, has been criticised for not having been more forthcoming in discussing plans to limit air travel's carbon emissions from 2011, and recently, an EU member-country coalition of 15 air passenger fees, with a handful of politicians comparing this to the cost of a cigarette or a 'sin tax' for things like tobacco and gambling.

From top: The Kuala Lumpur International Airport jungle walk inside the Satellite Terminal; the ETL is among the cleanest and greenest street car systems in the world; the Airport White A Forest And A Forest Within An Airport concept

Although many western aviation companies enjoy excellent green practices, the industry seems to be on the defensive.

Aviation players in Asia, however, are fighting back.

The chief executive of Hong Kong carrier Cathay Pacific Tony Tyler says that the aviation industry has been largely dismissed due to its role in climate change, and that a more rational debate is required.

"It got really tied up with things that are written or said in some parts of the world about aviation's responsibility versus change," he says.

"Aviation in Europe had become pretty negative for a while. In actual fact, the aviation industry is responsible for just 2% of global carbon dioxide (CO2) emissions, compared to the much bigger 'emitters' such as power generation."

He adds that Cathay Pacific itself has improved energy efficiency and introduced measures to offset its carbon emissions.

Some time ago, Japan Airlines became the first airline to conduct a

decarbonisation flight using a blend that combines three sustainable fuels: paraffin (84%), kerosene (15%), and algae (less than 1%). No modifications to the aircraft engine were required for the flight, which is a drop-in replacement for petroleum-based fuel.

In October last year, the first AIRBUS Green Flight took off, seeking to reduce CO2 emissions by 15,500 and total fuel consumption by 5,302 litres by implementing a range of eco-friendly practices.

For the passengers, the experience began with a Special Green Counter and paperless ticketing. Even the vehicles used for airport services were certified as environmentally friendly and on board, cabin crew carried the message of conservation.

There was maximum use of recyclable materials for meals, waste was separated in the aircraft and the duty-free bags were recyclable. Even the weight of baggage carried on board had been reduced.

Most of the weight was replaced by a swap-out method: On the ground, the aircraft was pushed back from the terminal and towed as far as possible

while the takeoff was on reduced thrust to burn less fuel. The aircraft had been prepared further by a full wash of its fuselage and engines to reduce wind drag while in flight. More such flights have been scheduled, with JAL planning to eventually implement the eco-friendly knowledge gained on all flights.

In 2007, Air India won awarded the prestigious National Project Public Award, Awarded by the United Nations Environment Programme (UNEP) in recognition of its efforts in environmental protection, particularly of the ozone layer.

To the south, SriLankan Airlines is only one of a number of airlines that have been awarded the special Environmental Trust, has also been appointed to drive the effort.

As SriLankan spokesman says, "Our Green Policy is being formulated to take us to a position of environmental excellence in the global aviation industry."

Most people are unaware that Malaysia has been among the world's leaders in environmental-friendly

► MORE ON NEXT PAGE

ASIA-PACIFIC AIRPORTS/OCTOBER-DECEMBER 2009 29



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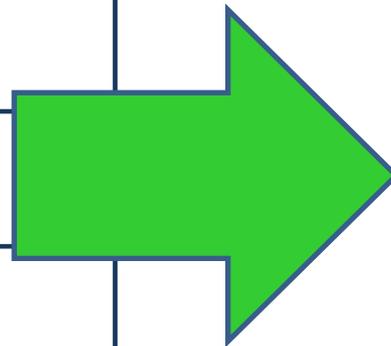
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**OUR ENVIRONMENTAL PLANS MOVING FORWARD**

# klia2 GREEN BUILDING

## LEED Classification RATING POINTS

<i>Platinum</i>	<i>80 and above</i>
<i>Gold</i>	<i>60-79</i>
<i>Silver</i>	<i>50-59</i>
<i>Certified</i>	<i>40-49</i>



## GBI Classification RATING POINTS

<i>Platinum</i>	<i>86 and above</i>
<i>Gold</i>	<i>76-85</i>
<i>SILVER</i>	<i>66-75</i>
<i>Certified</i>	<i>50-65</i>

- It is beyond collecting points
- It's a commitment of all parties , operator, stakeholders, commercial, towards being sustainable
- It is an overall holistic integration of many aspects
- It is a continuous and persistent effort to reach sustainable goals and work together

# klia2 GREEN BUILDING

## **klia2 Airport Main Terminal Building**

- Designed and planned as 30 percent more efficient than international standards, 50 percent more efficient than local standards

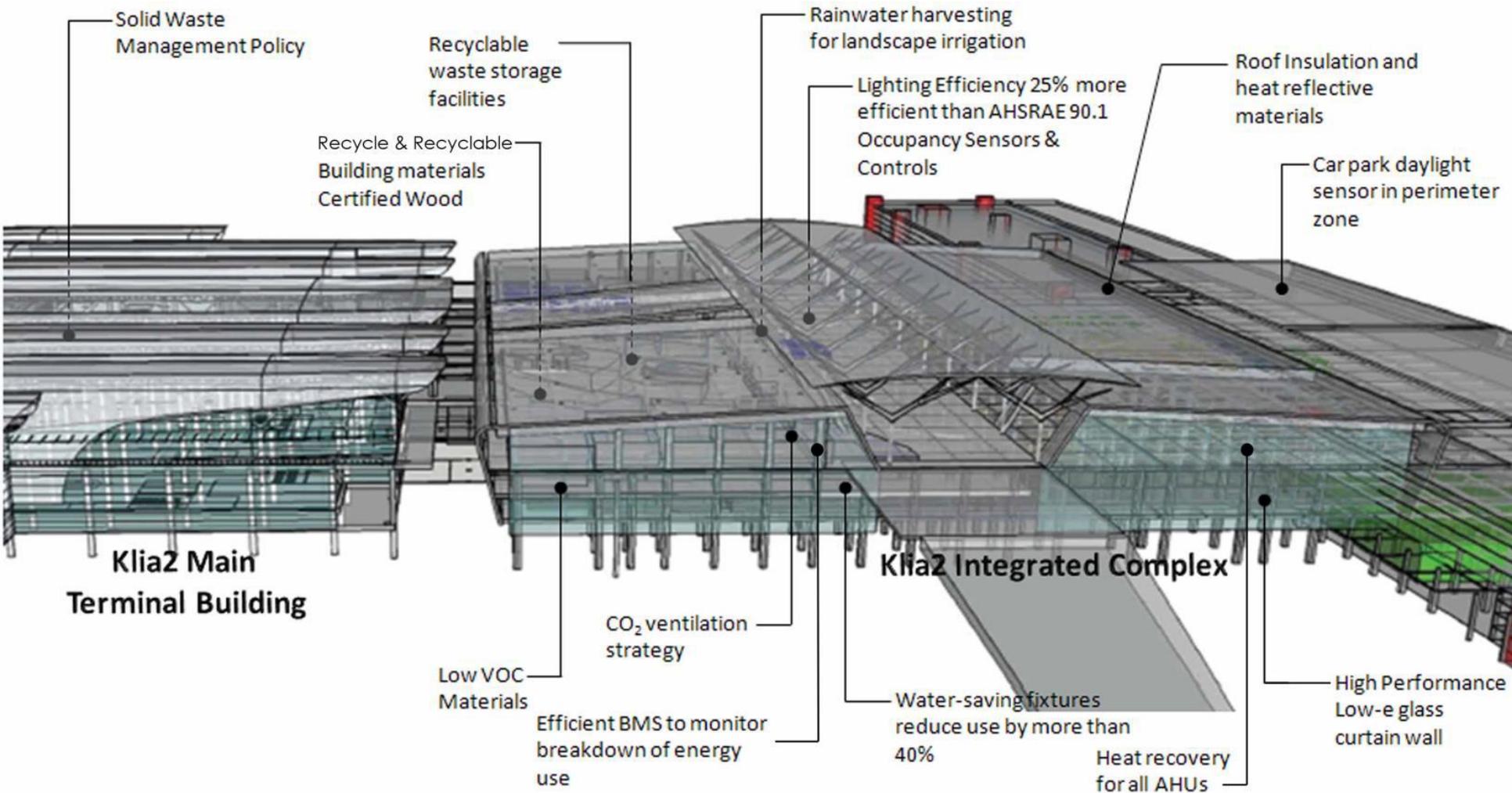


## **klia2 Retail Mall and Integrated Complex**

- Designed as 15 percent more efficient than International standards, 25 percent more efficient than local standards



# klia2 GREEN BUILDING



# klia2 GREEN BUILDING

## Energy Efficient Design Strategies (Active)

- Variable speed drives for all AHUs
- Lighting efficiency \* 25 percent more efficient
- Lighting equipped with sensors switch off with available daylight
- Demand control ventilation with CO2 sensors
- Variable air volume for office working areas and S3
- Airport BMS system able to monitor in detail the breakdown of energy use throughout the year in order to save energy during operations of airport



\* ASHRAE 90.1 max standards

# klia2 GREEN BUILDING

## Energy Efficient Strategies And Features ( Passive & Active Design )

- High performance façade systems
- Roof using reflective material
- Roof insulation
- Heat recovery for all AHUs
- Energy efficient lighting \*20 percent more efficient
- Demand control ventilation with CO2 sensors
- Carpark efficient lighting with daylight sensors in perimeter zones



## 2\_Energy Efficiency

Energy efficient lighting is 20% more efficient than international baseline standards

\* International baseline standards



# klia2 GREEN BUILDING

## BUILDING MANAGEMENT SYSTEM

- Building management systems in the terminal programmed to automatically turn off equipment when not in use and turn off lights in unoccupied areas or where natural light is bright enough by itself.
- They also control temperature and constantly monitor energy consumption so that efficient performance can be measured and maintained.



|\_klia2  
Green Features



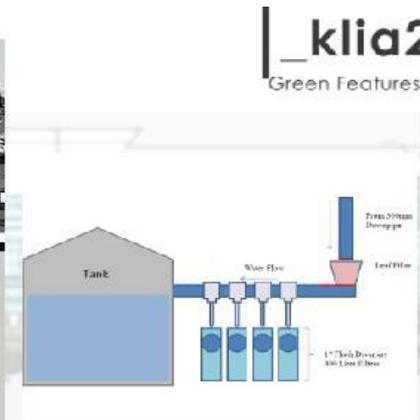
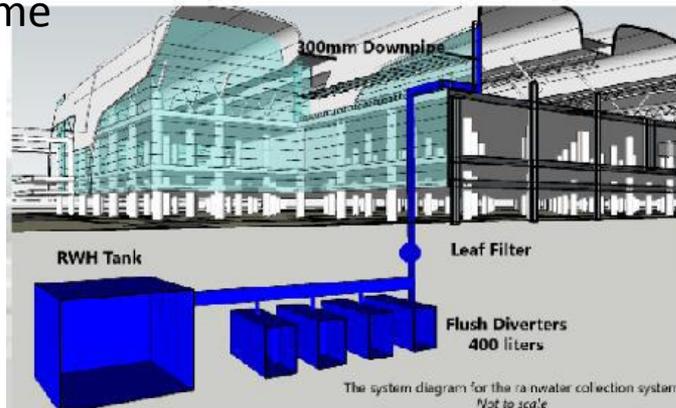
| **6** Building Management System  
Programmed to automatically turn off equipment  
when not in use and turn off lightings in unoccupied areas

# klia2 GREEN BUILDING

## Roof Design and Stormwater Roof Runoff Collection

### Rainwater Harvesting

klia2 roof collects all rainwater for non-potable water usages such as landscape water demands and toilet flushing requirements thus reducing processed potable water demands and used for landscape and flushing. Rainwater collection will at the same time reduce storm water runoffs.



|\_klia2  
Green Features

## |\_4\_Water Efficiency

Rainwater harvesting collection for non potable water usages such as landscapes and toilet flushing

# klia2 GREEN BUILDING

## District Cooling System

- **Thermal Energy Storage (TES)** The TES, acting like a large thermal flywheel, will shift cooling load on the chillers to off-peak times by charging the water in the tank. The tank volume will be cooled at night by the chillers hence the use of less-expensive off peak electricity rates, and reduces the need for additional chillers' capacity.



|\_klia2  
Green Features

### |\_7\_District Cooling System

Shift the cooling load on the chiller to off-peak times by charging the water in the tank.



- No CFC based refrigerant used in the district cooling plant and TB01 system
- Equipment leakage rate, type of refrigerant are specified to reduce ozone depletion and reduce global warming potential (GWP)
- Selection based on low global warming potential and low ozone depletion which minimize emission of harmful compound to the environment.

# klia2 GREEN BUILDING

## Green with tenants

### Energy & Atmosphere

- CFC (Chlorofluorocarbons) Reduction
- Optimize Lighting
- Optimize Lighting Controls
- Energy Efficient Equipment & Appliances
- Energy Accountability

### Materials & Resources

- Recycle
- Long term lease
- Minimize demolition
- Divert construction waste
- Re-use/refurbish furniture
- Use regional Materials

### Indoor Environmental Quality

- Thermal Comfort
- Day lighting
- Views
- Use low emitting materials (VOC)
- Carpeting
- Sealants
- Wall coverings
- Paints

# klia2 GREEN BUILDING



Designated parking lots for hybrid car users



Recycling bins



Car park designed to allow maximum daylight usage



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