Policies to improve air quality in Hong Kong
Anti-idling Policy

The Motor Vehicle Idling (Fixed Penalty) Bill:

• aims to reduce heat emissions, curb air and noise pollution
• allows idling for up to 3 minutes. Offenders to be fined HK$320.
• passed in March 2011. Takes effect in September 2011.
• applies to all roads in Hong Kong, including private roads, and car parks.
Exemptions to the bill include:

- poor weather conditions (Observatory warnings for storms or very hot weather)
- road accidents
- all taxi stands
- first 2 minibuses at minibus stands
- all vehicles (excluding private cars) with one or more passengers on board, and the vehicles immediately behind them
- emergency purpose vehicles (e.g. ambulance, police car, fire engines)
- garbage-disposal trucks and ice-storage trucks
Benefits of Anti-idling

- Idling causes twice the wear on internal parts compared to driving at regular speeds.
- A recent EPA study found that the emission pulse measured after a school bus is restarted contains less CO, NOx, and other pollutants, than if the bus idled continuously over a 10-minute period. The analysis indicated that continuous idling for more than 3 minutes emitted more fine particle (soot) emissions than at restart.

### Direct Reductions from Eliminating 5 minutes of Idling

<table>
<thead>
<tr>
<th>Engine Size</th>
<th>Daily Gasoline Not Burned</th>
<th>Annual Gasoline Not Burned</th>
<th>Annual Money Not Spent</th>
<th>Annual CO2 Not Emitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>.5 cups</td>
<td>10 gallons</td>
<td>$30</td>
<td>220 lbs.</td>
</tr>
<tr>
<td>8 Cylinder</td>
<td>1 cup</td>
<td>20 gallons</td>
<td>$60</td>
<td>440 lbs.</td>
</tr>
</tbody>
</table>

Source: Anti-idling Primer, Hinkle Charitable Foundation ([http://www.thehcf.org/antiidlingprimer.html](http://www.thehcf.org/antiidlingprimer.html))
Anti-idling Policies Worldwide

Countries and states that have enacted anti-idling policies include:

- 31 states in the USA
- Canada
- Japan
- Taiwan
- Singapore
- UK
- France
- Germany
- Italy
In Hong Kong, there are:

- 70 registered electric vehicles (EVs); 23 are part of the government fleet (January 2011)
- 265 charging stations (January 2011)

The other approximately 600,000 automobiles on Hong Kong’s roads emit hazardous pollutants.
Electrical vehicles do not emit roadside pollutants...

...therefore, they can help significantly improve air quality by the roadside.

According to CLP, an EV traveling 100km results in 8.4kg of CO2 emissions (from coal-fired powered plants), while a diesel car traveling the same distance emits 19.4kg of CO2 emissions - clearly signifying the effect that EVs can have in significantly reducing harmful emissions by the roadside.
What problems stand in the way of EV adoption in Hong Kong?

The Hong Kong Government is aiming for 30% of private cars and 15% of buses and trucks to be hybrid or electrical by 2020...

But...

• the high price: an EV costs 2-3x more than a comparable gasoline-powered car;
• the cost of a replacement battery: needs to be replaced every 4 years;
• range anxiety: EVs can only drive up to 160km on a full charge;

...are obstacles to achieving this goal.
What should the government do to promote greater EV use?

- Provide more economic incentives to encourage drivers to replace old, polluting cars
  - e.g. one-off subsidy (mainland China) or tax reduction (US)
- Create wider-ranging charging network
  - via greater cooperation with businesses such as supermarkets and car parks
- Simplify the EV license application procedure
  - If an EV is to be driven on highways, the owner must apply to Transport Department for a license beforehand. This process may take up to one month.
Global use of EVs in public transport

2010
Seoul
First commercial electrical bus route.

2011
Singapore
First hybrid bus.

Los Angeles
Last diesel-run bus retired. MTA became the first large public transit agency in the U.S. to operate only alternative-fuel buses, with 2,221 buses using compressed natural gas and others being electrical or hybrid.

2015
China
Planned to have 1 million electric vehicles.

2020
Seoul
120,000 electrical buses in service.

2030
China
Planned to have half the total number of cars be electric in 13 designated pilot cities.

*China – Beijing, Shanghai and Guangzhou have launched electrical buses in recent years.
Marine Emission Policies

Marine vessels:

• emit more street-level SO2 than any other source in Hong Kong.
• adversely affect areas along Hong Kong’s increasingly busy shipping lanes, e.g. Kwai Chung, Tsang Yi, Tuen Mun.
• emit pollution that causes 400 more children (8-12 years) in Kwai Chung to suffer respiratory problems, compared to less polluted areas.

This diagram shows the centre of concentration of street-level SO2 are the shipping terminals at Kwai Chung.

Source: HKUST
15 companies have voluntarily signed the Fair Winds Charter, meaning:

- they will use low-sulphur fuel while at berth in Hong Kong, beginning January 2011
- the new fuel they use will contain 0.5% sulphur content. (Hong Kong currently permits marine vessels to burn fuel with up to 4.5% sulphur content.)

However, the Hong Kong Government has made no regulations of this nature.
What should the Government do to lower marine emissions?

- Place marine air pollution under the regulation of the Air Pollution Control Ordinance (the main regulatory control mechanism for emissions within Hong Kong);
- Encourage utilization of low-sulphur fuels in Hong Kong’s own local marine vessels (e.g. ferries, fishing boats etc.);
- Take the lead and work with the Guangdong Government to standardize the use of low-sulphur fuel in the Pearl River Delta.
Marine Emission Policies Worldwide

U.S. and Europe have shown that two different approaches are being explored and implemented to lower marine emissions:

(i) the use of incentives for complying vessels in the form of reduced fees, shorter waiting time for dock space, and reduced inspection times

(ii) taxation, differentiated dues and other penalties for failing to comply.
Emission Capping and Control Policies
Power plants

Power plants make up the largest emission source in Hong Kong, accounting for 46% of total emissions of NOx and 28% of particulate matter in 2007.

- Government has promised to require power companies to set up effective emission abatement measures as the first criteria of licensing.
Emission abatement measures taken by Hong Kong Electric and CLP

- Retrofitting coal-fired generating units with flue gas desulphurization (FGD) systems and low-NOx burners.
- Replacement of ultra low-sulphur diesel as start-up fuel at all coal-fired units by 2013.
- Plans to increase use of natural gas in overall fuel mix to 40% (construction of submarine gas pipelines expected to commence in late 2011).
- Off-shore wind farms to be commissioned in 2015, which aims to generate 170 million units of electricity annually.
What the government should do...

• Impose more stringent regulations to **discourage** power companies’ **reliance on fossil fuels**
• Create **a supportive and profitable** environment for renewable energy projects, to enable power companies’ engagement in **large scale** local development
• **Create a market** by switching to renewable energy (government is largest purchaser of power)
• Focus on areas such as **solar, wind and energy-from-waste energy**
Energy Efficiency Measures
Building Energy Codes

Buildings make up 90% of HK’s electricity consumption.


- Mandating compliance with the Building Energy Codes (BECs) for minimum energy efficiency standards for air-conditioning, electrical installations, lifts and escalators, and lighting in buildings.

- Expected energy saving:
  - 2.8 billion kEh in the first decade
  - CO2 emissions reduced by 1.96 million tonnes
In 2009, HK$450 million was provided to subsidise energy-cum-carbon audits and energy efficiency projects in Hong Kong’s buildings...

What more should the government do?

• **Raise sustainability standards** by developing Hong Kong-specific rating tools
• **Establish expert bodies** to provide guidance with regards to construction projects
• **Require private developers to adhere to stringent standards** when purchasing land from the Government
• **Upgrade electrical installations** in government offices and buildings
• **Offer incentives** (e.g. **loans and guaranteed savings**) to upgrade buildings
Case study: Melbourne Council House 2

• Imitates the Earth’s natural ecology using solar energy, light, air and rainwater to power, heat, cool and water itself
• Exterior moves with the sun to reflect and collect heat
• Reduced CO2 emissions by 87% and electricity by 82%

Cost of sustainability features: USD11.3M (savings from features will cover this cost in a decade)
Transport Management
Low Emission Zones (LEZs)

Estimated result: reduction of particulate matter by 14% and NOx by 26%

• **2011** - Pilot scheme to increase ratio of low-emission buses running in Central, Causeway Bay and Mong Kok

• **2015** - only Euro IV and above buses allowed to enter LEZs

Major criticisms of the scheme:
• No sense of urgency; continual delays of start date with “lengthy studies.”
• Lacks feasibility without replacing almost 2,200 buses that currently do not meet standards.
Example: London’s Transport management

From 2003 a number of schemes were launched to combat poor air quality – named “worst in Europe.”

**Congestion charge (2003):**
- 60,000 fewer vehicles entering CC zones in the first 6 months
- By 2006, NO\textsubscript{2} emissions fell by 17%, PM10 by 24% and CO\textsubscript{2} by 3%

**LMZ (2008):**
- Trucks’ and buses’ emission had to reach EU standards
- £200 per day penalty for offenders

**2011:**
- Extra £5 million pledged to clean the air
- Trials of dust depressants which “glue” pollutants to the street
- Deployment of low emission buses, local cycling and walking schemes
- 90 hybrid buses launched in air quality hotspots
Infrastructure Development and Planning
Cycling network

Benefits of a cycling network

• Safe and sustainable transport option
• Reduced travel times
• Less on-road congestion
• More seats on public transport
• Zero emission
• Better connected neighborhoods
• More active and healthy community

The New Territories Cycling Network –
Work expected to start: June 2012
Proposed completion: Mid 2015

Route:
Tsuen Wan, Tuen Mun, Yuen Long, Sheung Shui, Fanling, Tai Po, Sha Tin, Ma On Shan
How to increase use of cycling?

What the government should do:

• Advocate economic benefits from reduced congestion, health of the community and independence from private vehicles and public transport
• Create connections with major transport hubs
• Encourage replacement of shorter journeys
• Enhance convenience through rental facilities
• Offer free cycling lessons
• Create cyclist-friendly workplaces at government offices, encourage private businesses to follow
Case Study: Freiburg, Germany

History:
• Heavy investment in cycling networks throughout the 1980s (spending HK$75 per resident annually)

Current:
• 175 miles of bicycle lanes;
• “Bicycle Highway” across the city;
• designated cycling streets;
• more than 5,000 bike parking spaces

Result:
• A third of all journeys carried out by bike