

**WORKSHOP: CONFRONTING CLIMATE CHANGE
- TOWARDS CARBON NEUTRAL INDIAN CITIES**

**Session III: Climate change & Sustainable Transport
system in cities**

**Sustainable Transport Options for Cities :
Global Perspective**

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Rickshaw strike reduces air pollution



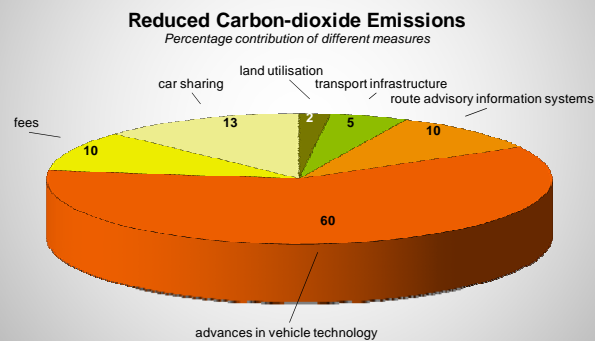
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Strike impact

AIR QUALITY READINGS TAKEN AT STOP, KARVE ROAD BEFORE THE RICKSHAW STRIKE:		AIR QUALITY READINGS TAKEN AT PIMPRI-CHINCHWAD BEFORE AUTO STRIKE	
April 1, 2009	150	April 5, 2009	88
April 3, 2009	138	April 6, 2009	95
April 4, 2009	136	April 7, 2009	77
April 6, 2009	155	April 12, 2009	108
READINGS TAKEN DURING THE AUTO STRIKE		READINGS TAKEN DURING THE STRIKE	
May 1, 2009	107	May 1, 2009	53
May 3, 2009	117	May 4, 2009	57
May 5, 2009	112	May 5, 2009	61
May 6, 2009	109		

Potentials to reduce CO2 emissions from transport

An example from a Swedish investigation



Is the workshop introduction relevant?

- Of course but.....

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- “With ever increasing population, cities are becoming a large source of GHG emissions from anthropogenic activities as the direct or indirect **consumption of natural resources** in the **cities** are currently at **heightened** levels as **compared to their rural** counterparts.”
- *Is this globally true? Is it really an urbanizations problem. I will explain what I mean below.*

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- “The emissions are mainly from electricity consumed in domestic, commercial and public sectors for **lighting, cooling, water pumping, and office management** etc and **fossil fuel consumed in sectors such as transport, cooking and in generators for generating electricity** during outages.”

But

- *The potential for **low per capita CO2 emissions in the urban areas is higher than in rural areas!** Especially concerning **heating, cooling and transport.***
(central heating/cooling, public transport)

- “The **consumption levels** are likely to be **skewed further**, if in the 2050s, according to the UN projections, 70% of the world population resides in cities of which 60% will be in the Asian cities that already have larger urban population than all other regions of the world combined.”

So what:

- *Consumption levels are more correlated to where **poor and rich** people are settled! Not to **urbanization.***

- “As a result, the GHG **emissions from the urban cities** are emerging as a **major source**, contributing significantly to the global climate change.”

Yes:

- *because the majority of people (= consumers) are living there.*

But still:

*If this indicates that **urbanization is the problem** the conclusion could be **totally wrong** in the long run!*

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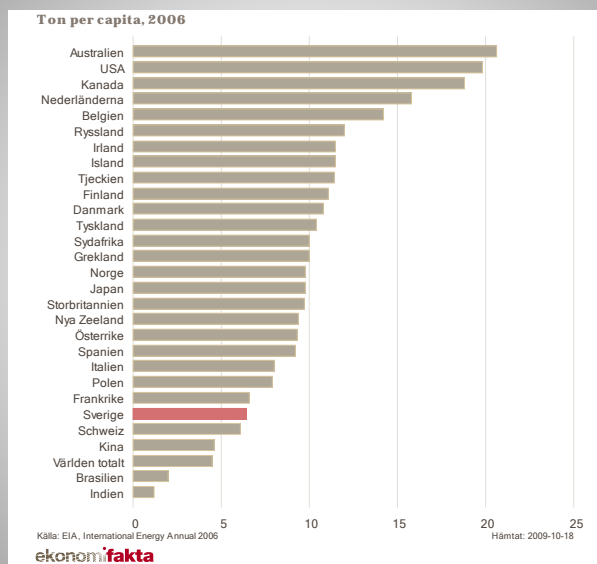
- “Currently the mega **city of Delhi** emits **2.0 t CO₂/capita** as against the **national average of 1.2 t CO₂/capita**.”

But

- ***The situation in Sweden (as in most western countries) is the other way around!***
- *The per capita emit in Sweden in urban areas is about half of the level in rural areas or less! Annual emission is in **Stockholm 2,74 t CO₂/capita** and the Swedish **national average is 6,43 t CO₂/capita** (2006).*
- Most likely will future the situation be similar in India, when the distribution of wealth will be more equally distributed between urban and rural areas.

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CO2 emissions in some countries



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Another source is ranking 210 countries:

Rank		tCO ₂ /cap (2006)
1.	Qatar	56.2
2.	United Arab Emirates	32.8
3.	Kuwait	31.2
4.	Bahrain	28.8
5.	Aruba	22.3
6.	Luxembourg	24.5
7.	Netherlands Antilles	22.8
8.	Trinidad and Tobago	25.3
9.	United States	19
10.	Canada	16.7

62.	Sweden	5.6

96.	China	4.6

139	India	1.3

210	Burundi	< 0,1

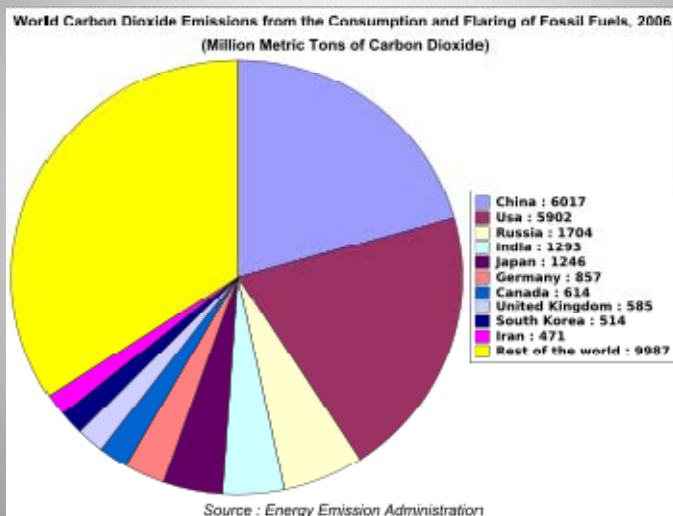
Note:

Direct emissions only. For instance, around 33% of [China's](#) emissions in 2005 were due to the production of exports rather than consumption.

Source: US Department of Energy's Carbon Dioxide Information Analysis Center (CDIAC)

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If you look at the total emissions by country the picture is quite different



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- “Even if this business as usual scenario persists, **additional electricity and water demands** have to be catered to, which means further **higher levels of GHG emissions** in the future.”

Well

- ***It depends? Decoupling of energy consumption / CO2 emits?***

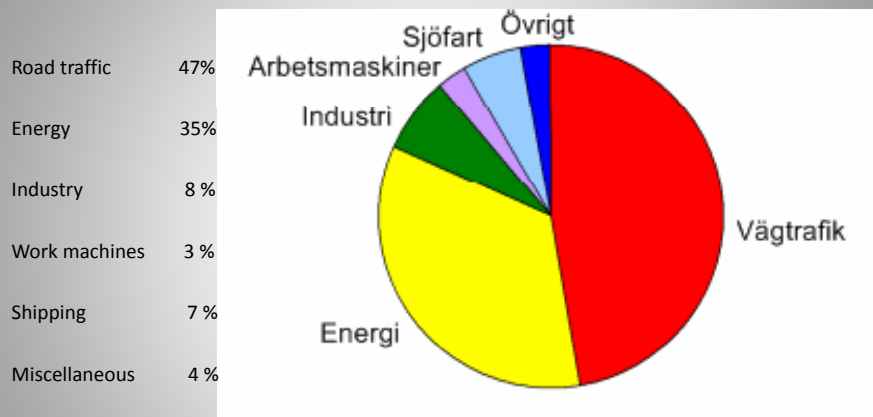
And finally the introduction states:

- “Continuous increase in GHG emissions can be curbed without **compromising on the developmental goals** of the cities by embracing policies that **promote sustainable technologies** that are more or less **carbon neutral** and this is being done increasingly in the cities in the west.”
- ***Yes! I agree and it’s probably easiest to decouple energy consumption from CO2 emissions in urban areas!***

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CO2 emission sources

Ex. From Stockholm



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Examples of measures taken or in the pipe to reduce CO2 emissions from transport

Vehicle technology

- The **vehicles, engines** and the **exhaust emission control** systems have been radically improved during the last 15 years and the potential is still high

Example:

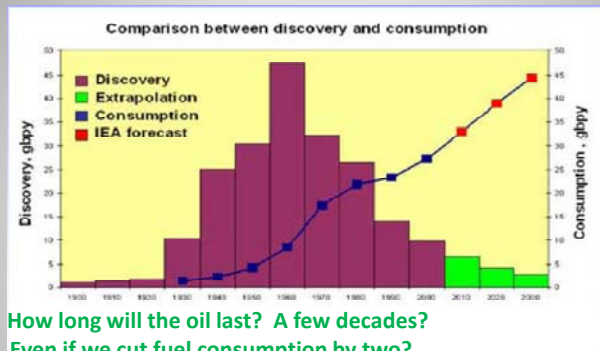
- 4-cylinder 1600 cc instead of 6-cylinder 2400 cc
 - From 0.8 l/10km to 0.6 l/10 km - 25 %
- Change to an electric car
 - From 0.6 l/10 km to 2 kWh/10 km - 60%
- Build a lighter car
 - Like the VW 1-litre car
 - From 0.6 l/10km to 0.1 l/10k



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Measures taken...cont.

Fuel



How long will the oil last? A few decades?

Even if we cut fuel consumption by two?

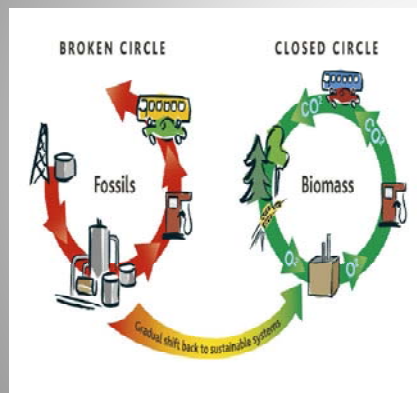
Probably we just buy ourselves another 20 years !!!

The use of fossil fuel is beginning to be phased out and carbon neutral fuel will probably be commonly used within the next decades. 2050 people might regard the **fossil fuel parentheses** as a strange and negative period in the vehicle history.

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Measures taken...cont.

- Switch to renewable fuel
- Plug in Hybrids



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Measures cont.

Management

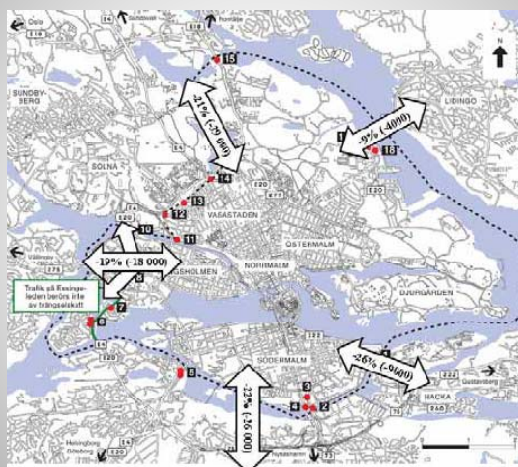
- **Mobility management** and **traffic management** are being more frequently used as tools to make people **aware** of alternate ways to travel and their consequences and to achieve more **efficient use the existing transport system**.

Charges

- **Urban Road User Charges** are still rarely used but many regions **consider introducing** them following the examples from e.g. Singapore, Oslo, London and Stockholm.

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Congestion Charges in Stockholm 2006



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Estimated reductions of road traffic emissions in Stockholm 2006 with Congestion Charges

	Inner city:		City of Stockholm:		Greater Stockholm*:	
	t/year	per cent	t/year	per cent	t/year	per cent
Nitrogen oxides, NO _x	45	-8.5%	47	-2.7%	55	-1.3%
Carbon monoxide, CO	670	-14%	710	-5.1%	770	-2.9%
Particles, PM ₁₀ total	21	-13%	23	-3.4%	30	-1.5%
“road wear particles”	19	-13%	21	-3.3%	28	-1.5%
“exhaust particles”	1.8	-12%	1.8	-4.4%	2.1	-2.4%
Volatile organic compounds, VOC	110	-14%	120	-5.2%	130	-2.9%
benzene, C ₆ H ₆	3.4	-14%	3.6	-5.3%	3.8	-3.0%
Carbon dioxide, CO ₂	36,000	-13%	38,000	-5.4%	41,000	-2.7%

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Measures cont.

Public Transport

- Development of public transport systems is ongoing in most densely populated regions worldwide. Many western and Asian cities have **high capacity metro and commuter train** systems.
- Other cities have or are developing **Bus Rapid Transport** systems, not as carrying capacity efficient as the track bound ones but, often an economically realistic step in the right direction.

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Measures cont.

Integrated Planning

The advantages of integrated **land use and transport planning** ought to be obvious and used everywhere, but that is not the case.

It often seems **theoretically easy** to carry out integrated planning, but there are several obstacles to overcome in practice. It could depend on the **divided responsibility** for different sectors concerning planning and implementation as well as the **land owner structure** and the **institutional rules** controlling current and future land use and market forces.

Some fields for integration:

- integration of land use plans, transport plans and plans for environmental protection
- integration of social and economic development with sustainable urban growth
- integration of planning and implementation
- integration of administrative matters
- integration geographically

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Summing up

There is a **toolbox** with a huge amount of instruments to use in order to reduce CO₂ emissions from the traffic.

Three of the most important **measures** with **great potential** to achieve result within the next decades:

- Minimize the **fossil fuel parentheses**
- Develop efficient **Mobility Management and Traffic Management** systems
- Provide the citizens attractive **Public Transport** systems = smart alternatives to private motorized transport for **all**

Transport CO₂ emissions could be almost neutralized

– if the public and political will is strong enough!

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Thank you for your attention

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