9th Urban Mobility India Conference & Expo 2016
Planning Mobility for City's Sustainability

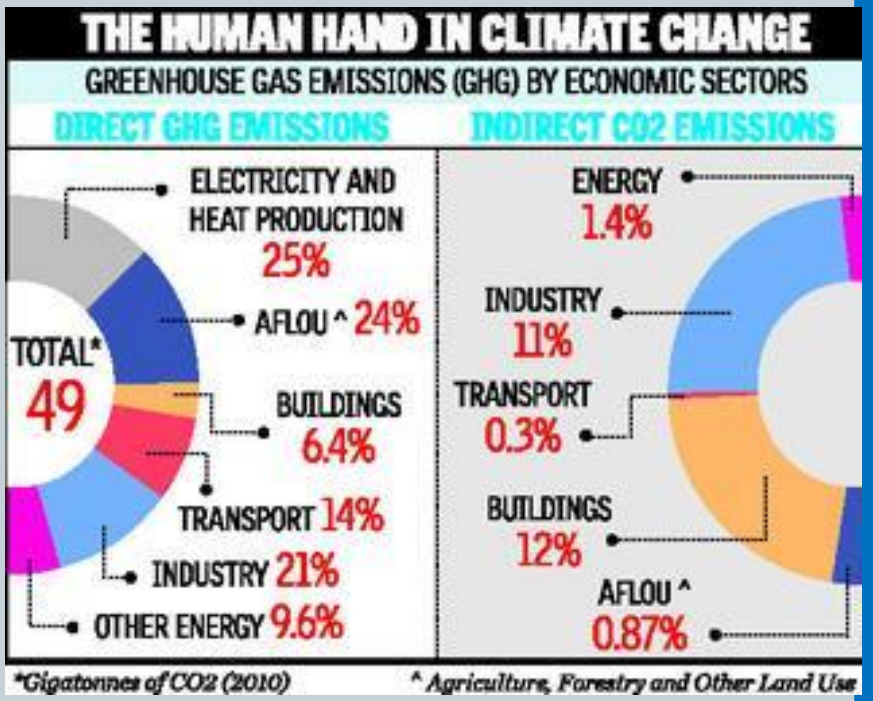
NATIONAL POLICIES AND REGULATIONS TO ADDRESS IMPLEMENTATION OF INTERNATIONAL COMMITMENTS ON CLIMATE CHANGE IN THE CONTEXT OF URBAN TRANSPORT

Dr. Sewa Ram
Professor,
Department of Transport Planning,
School of Planning & Architecture,
New Delhi


CLIMATE
CHANGE
AHEAD

Understanding Climate Change

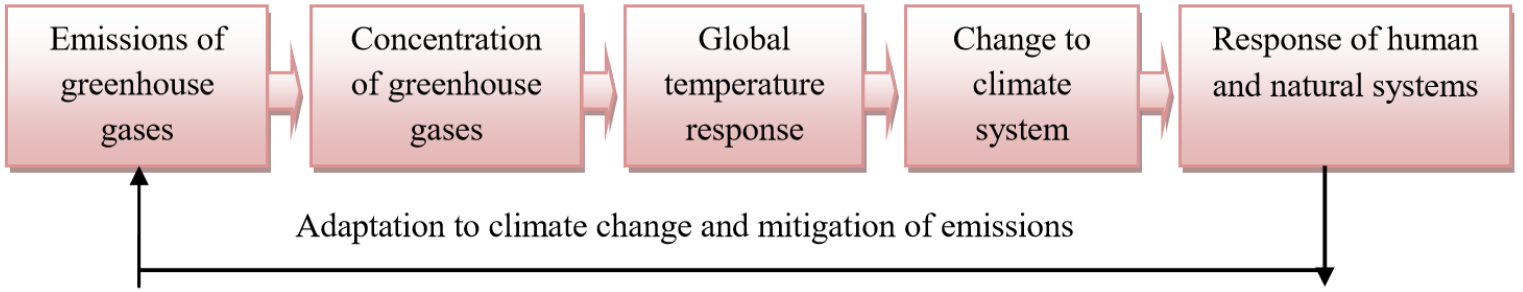
- 20 percent of the world's population living in developed countries account for 46.4 percent of global greenhouse gas emissions.
- 80 percent of the world's population living in developing countries account for the remaining 53.6 percent.
- The United States and Canada alone account for 19.4 percent of global greenhouse gas emissions, while all of South Asia accounts for 13.1 percent, and all of Africa just 7.8 percent.



Source: The Hindu, November 3, 2014

Understanding Climate Change

Casual chain of GHG emissions leading to climate change



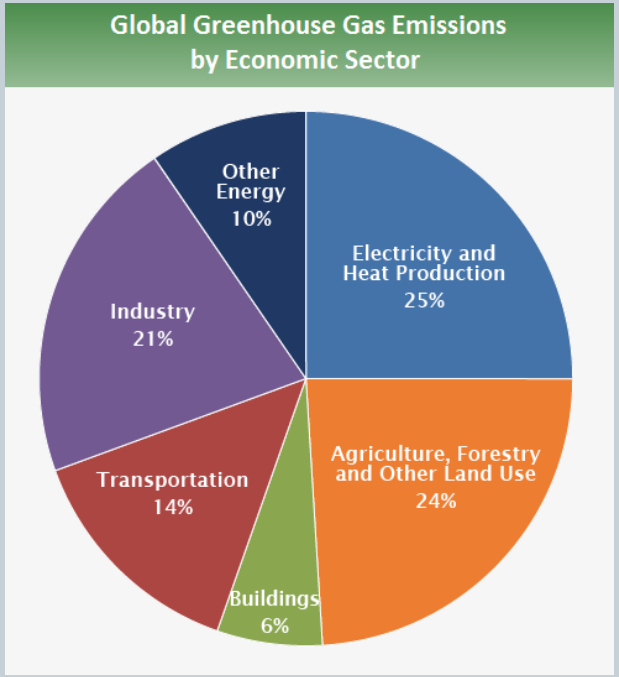
Source: First Assessment Report of Urban Climate Change

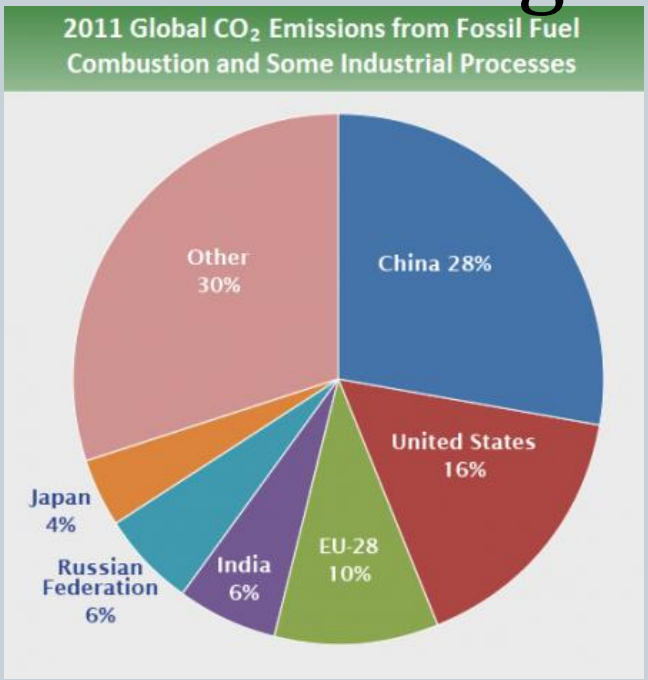
Main findings and predictions on world's climate

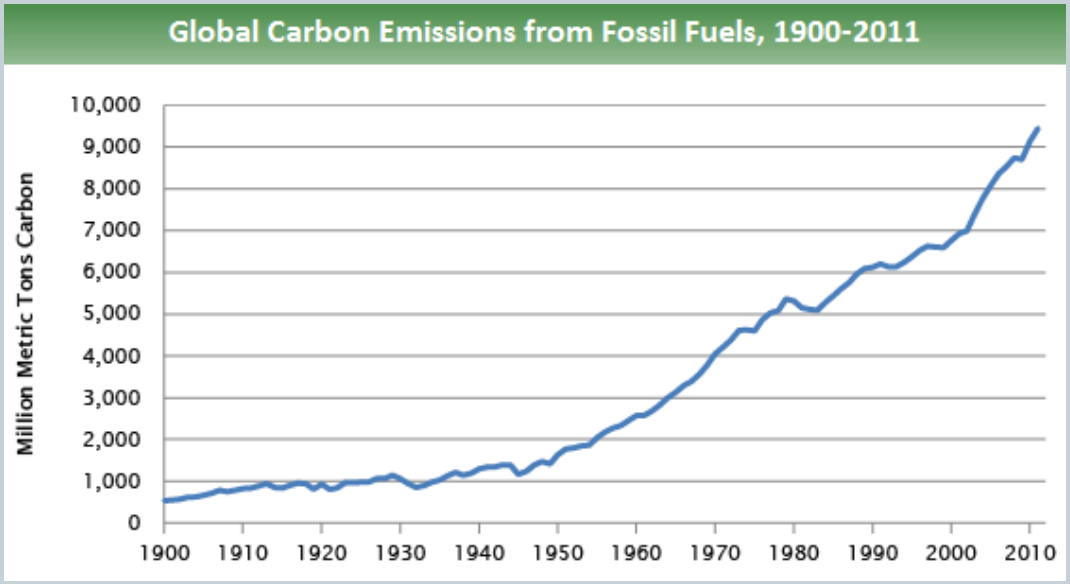
Temperature rise of 2.0 to 11.5 degrees Fahrenheit by 2100	Sea level rise of 7 to 23 inches by the end of the century	Snow cover to shrink with increases in thaw depth of most permafrost regions	Increase in hurricane and tropical cyclone strength can be attributed to man-made global warming	Very likely that extreme hot, heat waves and heavy rainfalls will become more frequent

Source: IPCC, 2007 Report

Understanding Climate Change

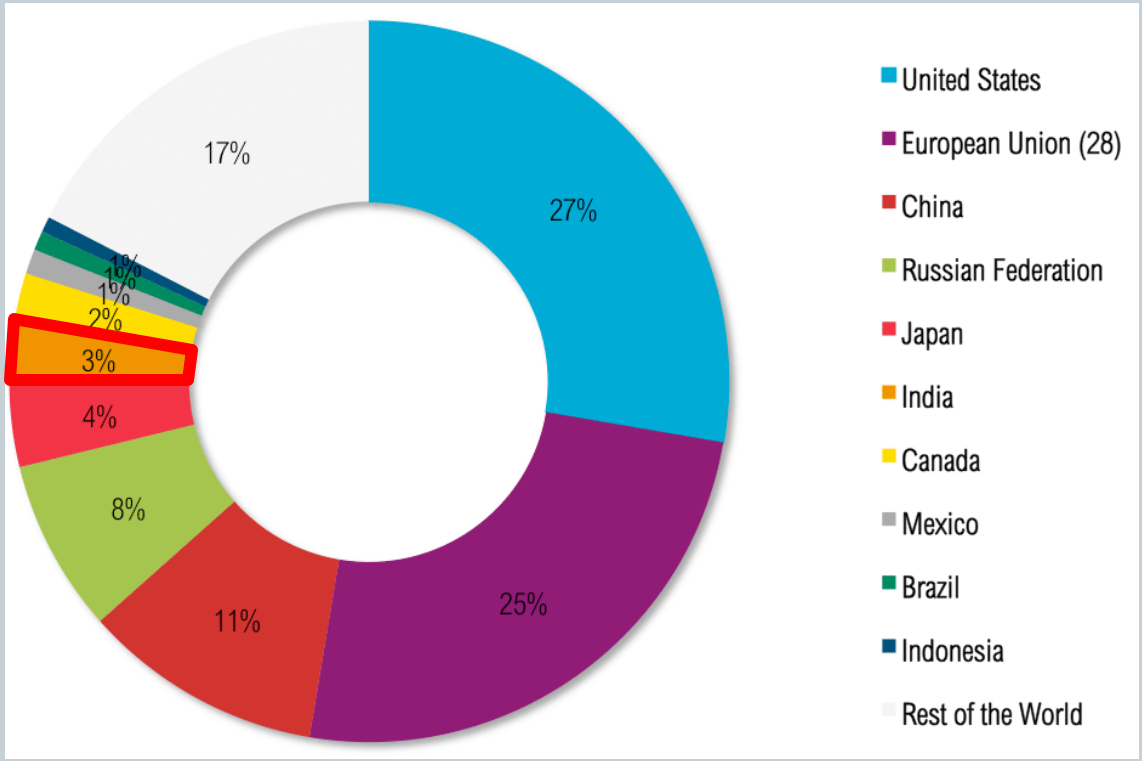






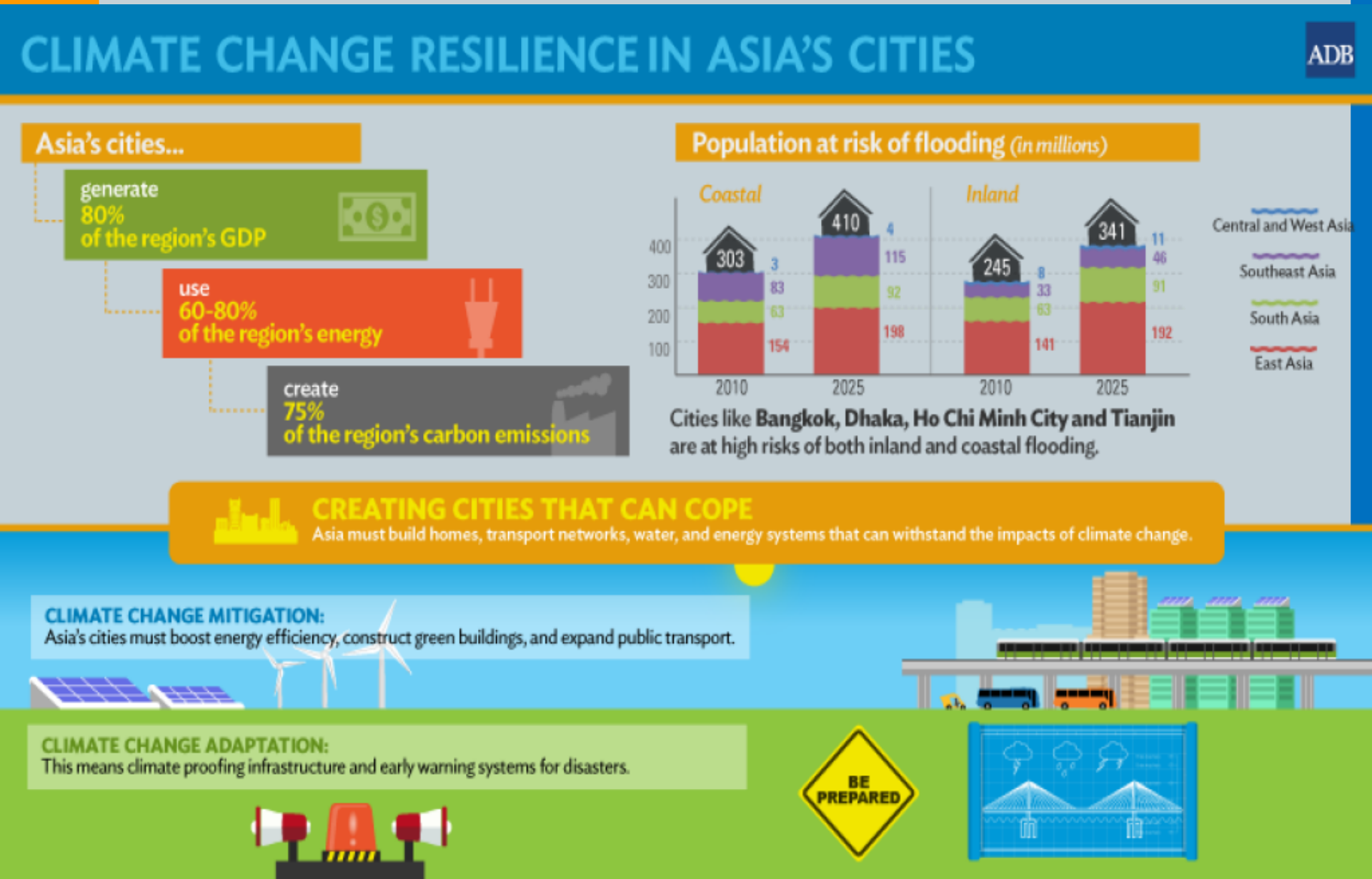
Understanding Climate Change

Cumulative CO_2 Emissions 1850-2011 (% of World Total)

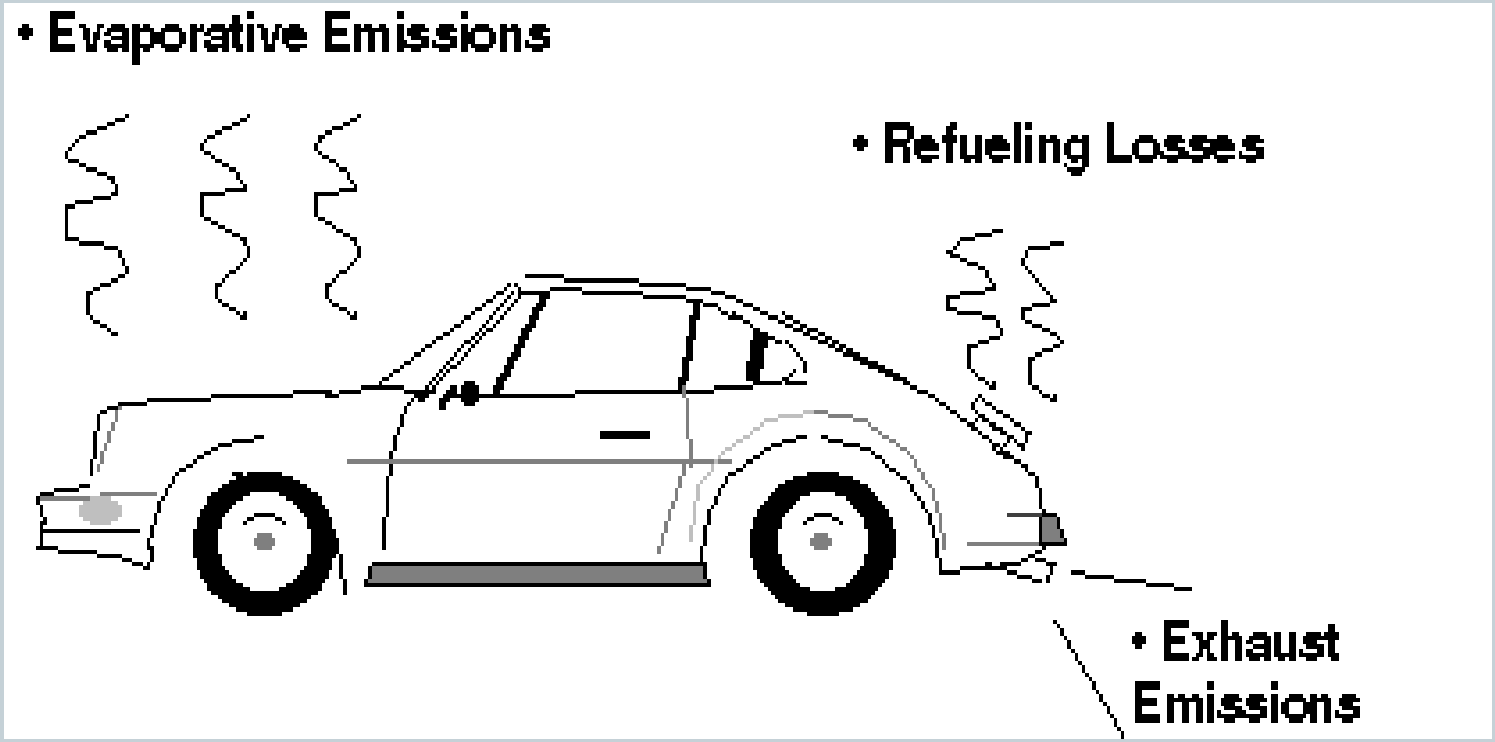


Source : World Resources Institute

Understanding Climate Change

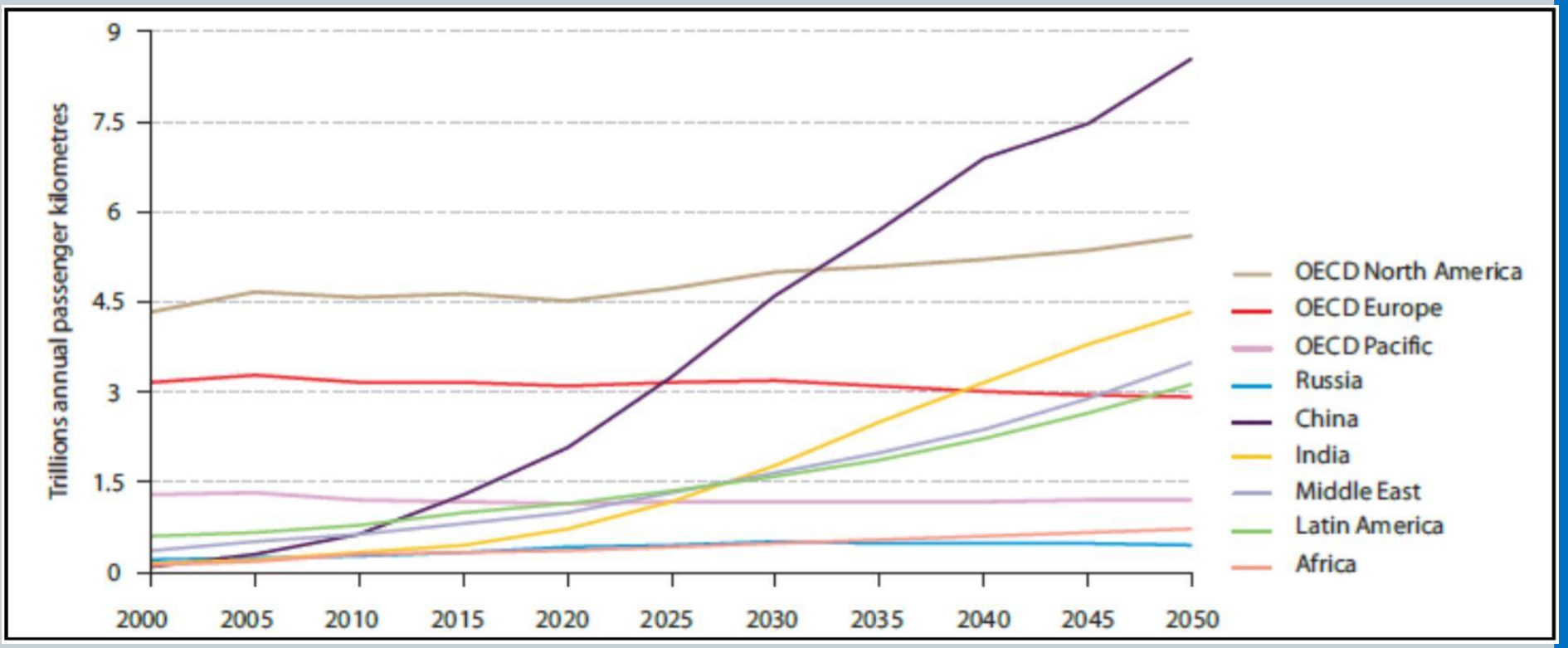


Influence of Urban Transport on Climate Change



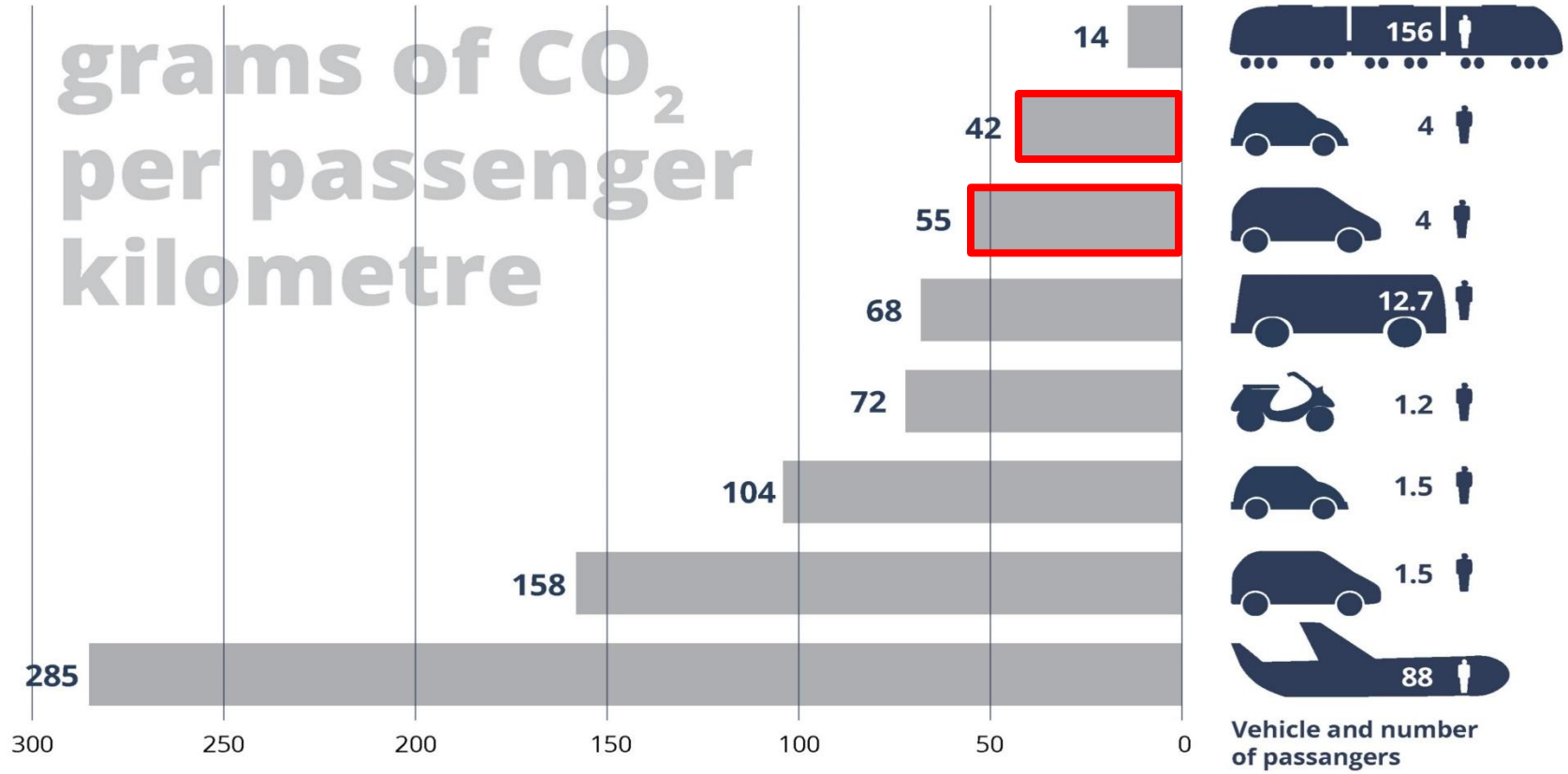
Influence of Urban Transport on Climate Change

Expected urban private motorized travel (in passenger kilometres)



Influence of Urban Transport on Climate Change

CO_2 emissions from passenger transport



Note: The figures have been estimated with an average number of passengers per vehicle. The addition of more passengers results in fuel consumption – and hence also CO2 emissions – penalty as the vehicle becomes heavier, but the final figure in grams of CO2 per passenger is obviously lower. Inland ship emission factor is estimated to be 245 gCO2/pkm but data availability is still not comparable to that of other modes. Estimations based on TRACCS database, 2013 and TERM027 indicator.

Source: EEA report TERM 2014
eea.europa.eu/transport

Transport sector in India

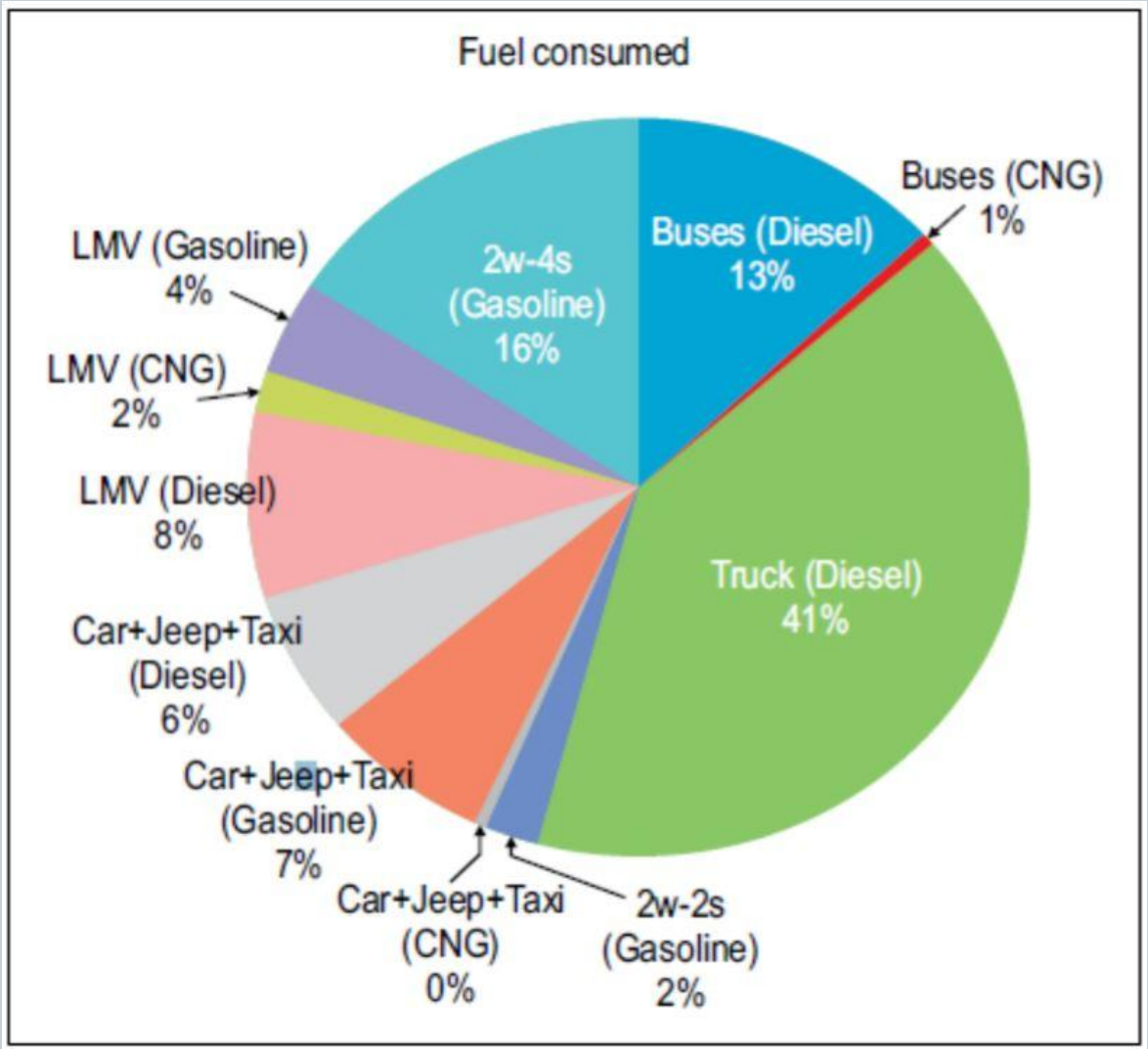
- The total passenger kilometres expected to increase from nearly 3,635 billion in 2005 to nearly 19,437 billion by 2030.

- The transport sector account for **142.04 million tons of CO_2 emissions**, i.e., **7.5% of the total GHG emissions in the country** in the year 2007.

- Road transport alone accounted for 87 percent of the GHG emissions (i.e., 123.57 million tons of CO2e) (ICAMP, 2013)

Transport sector in India

The vehicle-wise share in overall energy consumption in 2010 in the road transport sector - India



Desired and Existing modal split for cities

Desirable modal split for Indian cities of various sizes (as a %age of total trips by mechanical modes)

City size range (pop. In million)	Mass transport	Bicycle	Other modes
0.1 – 0.5	30 – 40	30 – 40	25 – 35
0.5 – 1.0	40 – 50	25 – 35	20 – 30
1.0 – 2.0	50 – 60	20 –30	15 – 25
2.0 – 5.0	60 – 70	15 – 25	10 – 20
5.0 plus	70 – 85	15 – 20	10 – 15

Existing modal split in Indian cities during 1994 (in %age)

City population (in million)	Walk	Mass transport	IPT Fast	IPT Slow	Car	Two wheeler	Bicycle	Total
0.10 – 0.25	37.1	16.4	10.4	20.1	3.3	24.1	25.7	100.0
0.25 – 0.50	37.8	20.6	8.9	17.2	2.6	29.8	20.9	100.0
0.50 – 1.0	30.7	25.4	8.2	12.0	9.5	29.1	15.9	100.0
1.0 – 2.0	29.6	30.6	6.4	8.1	3.3	39.6	12.1	100.0
2.0 – 5.0	28.7	42.3	4.9	3.0	5.0	28.9	15.9	100.0
5.0 plus	28.4	62.8	3.3	3.7	6.1	14.8	9.4	100.0

Source: Traffic and Transportation Policies and Strategies in Urban Areas in India. Final Report, Ministry of Urban Development, Government of India, New Delhi, March 1998.

Annual energy consumption by various transport modes

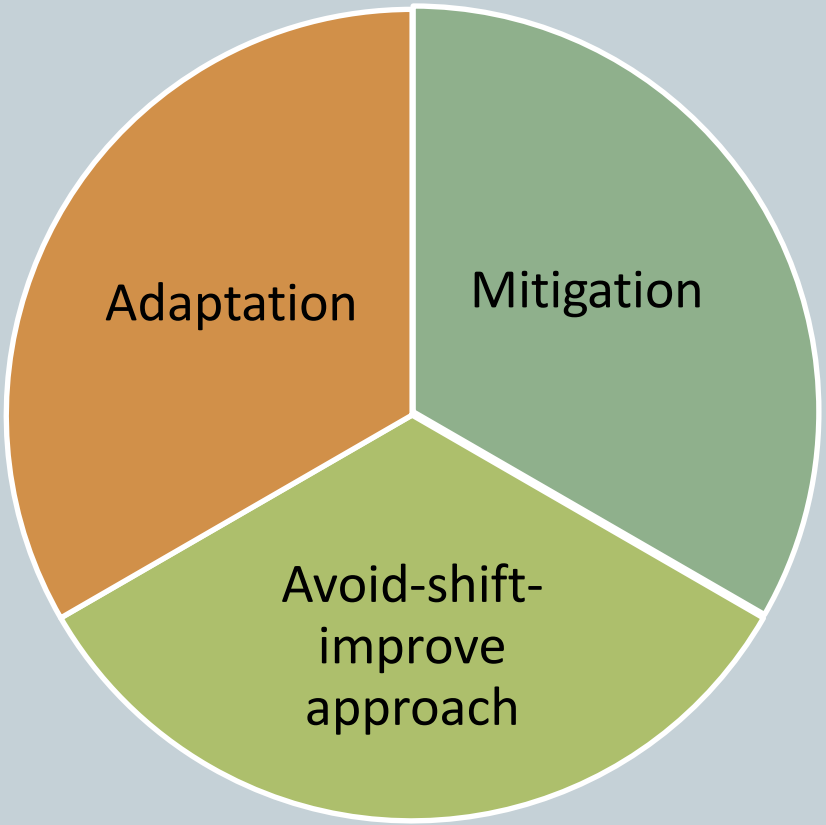
Estimated annual energy consumption in urban India during 1994

City size (Pop. in million)	No. of cities	Annual fuel consumption (in thousand tons)						
		2-wheelers	Cars/ Jeeps	3-wheelers	Buses	Trucks	Rail	Total
0.1 – 0.5	281	567	325	74	546	857	-	2369
0.5 – 1.0	34	215	198	52	230	405	-	1100
1.0 – 2.0	15	402	150	41	162	203	-	958
2.0 – 5.0	5	272	130	31	147	87	-	667
5.0 plus	5	403	373	51	528	213	6	1574
Total	340	1859	1176	249	1613	1765	6	6668

Source: Traffic and Transportation Policies and Strategies in Urban Areas in India. Final Report, Ministry of Urban Development, Government of India, New Delhi, March 1998.

Policies for dealing with Climate change

Minimizing the potential impacts on the transportation system from climatic changes.



Reduction in greenhouse gas emissions resulting from movement of goods, services, and people in cities.

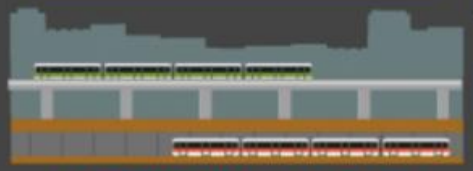
A-S-I approach makes an important contribution towards climate change adaptation strategy.

MITIGATING CLIMATE CHANGE IN TRANSPORT

A useful conceptual tool to guide in developing effective and efficient solutions for mitigating climate change in transport at country and regional levels is the **Avoid-Shift-Improve** approach.

AVOID

MEANS REDUCING THE NEED TO TRAVEL



INTEGRATING LAND USE AND TRANSPORT PLANNING to create local clusters of economic activity that **REQUIRE LESS MOBILITY**

Changing **HOW PRODUCTION IS ORGANIZED** like doing more online

Developing **MULTI-MODAL LOGISTIC CHAINS** to cut wasteful and unwanted trips

SHIFT

MEANS CHANGING TO MORE ENERGY EFFICIENT MODES

Shifting passengers from private vehicles to **PUBLIC TRANSPORT**

Bicycles provide a **HEALTHY, LOW-COST ALTERNATIVE** to the car

Shifting from road to **RAIL OR WATERWAYS** or onto well-defined trucking routes

IMPROVE

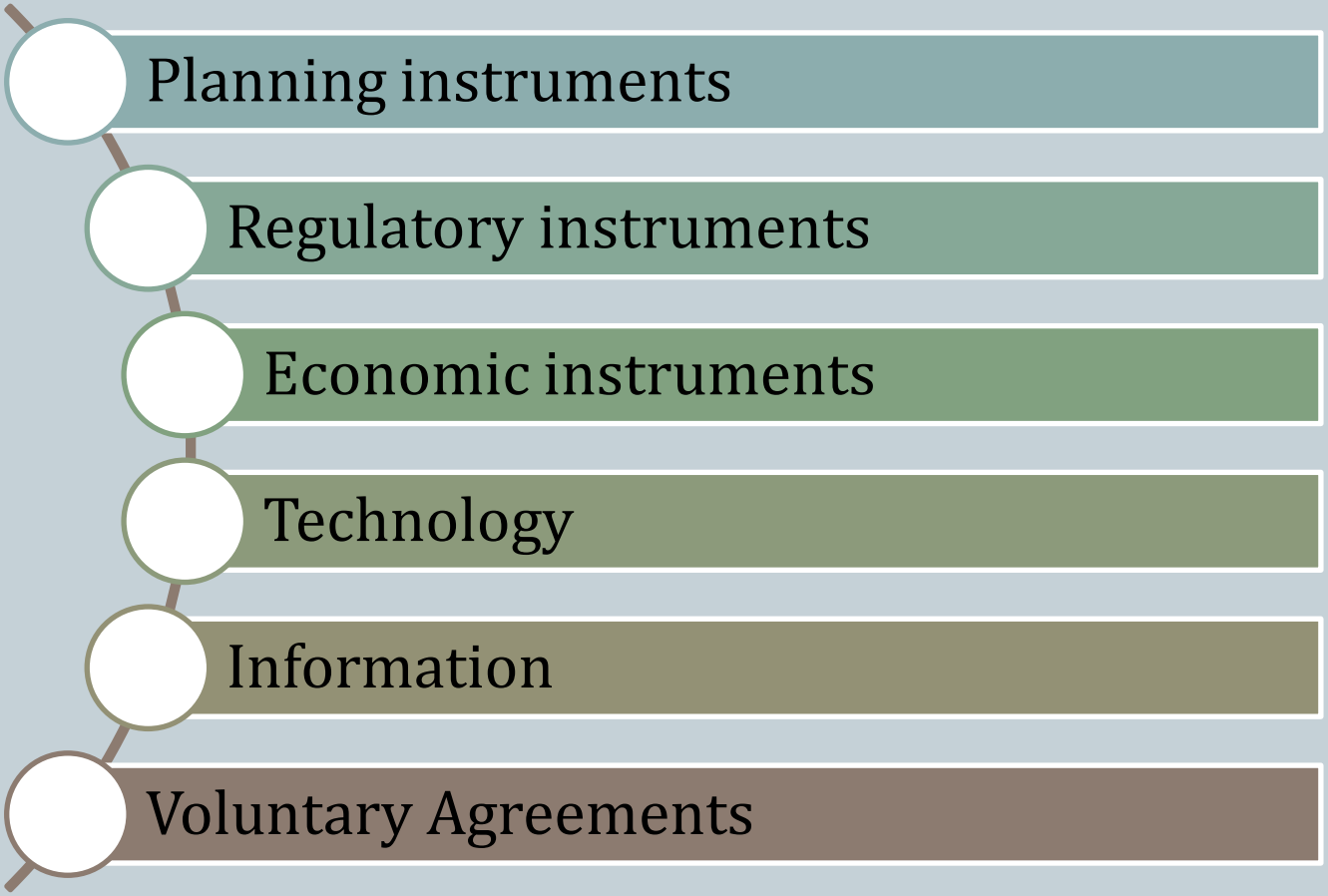
MEANS USING MORE ENERGY EFFICIENT TECHNOLOGIES

Improving **VEHICLE STANDARDS, INSPECTION AND ENFORCEMENT**

Developing **IMPROVED VEHICLE TECHNOLOGIES AND FUELS**

Improving **TRANSPORT EFFICIENCY** using information technology

Policy Instruments



Regulatory Instruments

- Mandatory emission norms
- Road pricing schemes
- Low Emission Zone (LEZ)
- Vehicle Quota System (VQS)

Economic Instruments

- Emission taxes
- Congestion charges and subsidies on the use of cleaner fuels.

- Singapore - congestion pricing for entering the central business district during peak hours - resulted in reducing the private car travel within the zone by 75%.

- Road pricing scheme in London introduced in February 2003, under which vehicles travelling in daytime central London incur a charge of 16$ /day. The scheme resulted in an estimated 19% reduction in CO_2 emissions from road traffic and 20% reduction in fuel consumption.

Technology

- Technological instruments are more effective when applied in conjunction with other policy instruments.
- Focus on cleaner fuels and efficient vehicle technologies.

Voluntary Agreements

- Agreements between government authority and private parties
- Achieving environmental objectives or improving environmental performance beyond compliance to regulated obligations.

Information

- Behaviour change campaigns, public information procurement and public acceptance monitoring.

- Eco-driving program in the Netherlands - achieved reductions in fuel consumption of between 0.3 and 0.8 percent, equivalent to 0.1– 0.2 million tonnes reduction in CO_2 emissions

- VMT (Vehicle Miles Travelled) reductions from car sharing - Switzerland, where car owners who sold their vehicles and became mobility car-sharing customers reduced their annual mileage driven by 72%.

Urban Transport Policies in India

- India signed the United Nations Framework Convention on Climate Change, and acceded to the Kyoto Protocol in 2002.

- India has communicated its voluntary mitigation goal of reducing the emissions intensity of its Gross Domestic Product (GDP) by 20–25 per cent, over 2005 levels, by 2020.

- The Government formulated the National Action Plan on Climate Change (2008)

- The National Mission on Sustainable Habitat - emphasizes on Better Urban Planning and Modal Shift to Public Transport.

Urban transport Policies in India

- **National Auto fuel Policy,** 2003 adopted a roadmap for progressively tighter fuel quality and vehicle emission standards through 2010.

- **Fuel conforming to BS (Bharat Stage) III** was introduced in 13 major cities across the country from the year 2005 while BS II fuel was made available elsewhere.

- National Transport Development Policy Committee, 2010 recommended **Tighter Bharat IV fuel quality standard** to be implemented nationwide by the middle of this decade, with a target to reach Bharat VI by 2020.

Urban transport Policies in India

- National Urban Transport Policy (NUTP) was created to motivate the building of people centric urban transport .

- National Environment policy (NEP) recommended Formulation of a national strategy for urban transport to ensure adequate investment, public and private, in low pollution mass transport systems.

- National Automobile Pollution and Fuel Authority (NAPFA) will be responsible for setting and enforcing vehicle emission and fuel quality standards in India .

Urban transport Policies in India

Numerous Legislative Acts have been enacted so far which have aimed at mitigating climate change and adapting to sustainable transport.

- **Air (Prevention And Control Of Pollution) Act, 1981**
- **Environment (Protection) Act, 1986**
- **Motor Vehicles Act, 1988**
- **Energy Conservation Act, 2001**
- **National Auto Fuel Policy, 2003**
- **Jawaharlal Nehru National Urban Renewal Mission (JNNURM), 2005**

Urban transport Policies in India

Numerous Legislative Acts have been enacted so far which have aimed at mitigating climate change and adapting to sustainable transport.

- **National Urban Transport Policy, 2006**
- **National Environment Policy (NEP) 2006**
- **Integrated Energy Policy, 2006**
- **National Action Plan On Climate Change (NAPCC), 2008**
- **National Transport Development Policy Committee, 2010**

National Action Plan on Climate Change, NAPCC

The National Action Plan on Climate Change (NAPCC) encompasses on **eight missions**, which are as follows:

1. **National Solar Mission**
2. **National Mission for Enhanced Energy Efficiency**
3. **National Mission on Sustainable Habitat**
4. National Water Mission
5. National Mission for Sustaining the Himalayan Ecosystem
6. **Green India Mission**
7. National Mission for Sustainable Agriculture
8. National Mission on Strategic Knowledge for Climate Change

United Nations Framework Convention on Climate Change

The UNFCCC was created in 1992 as the main forum for international agreement on tackling climate change. 195 countries have joined the international treaty.

Negotiations focus on four key areas:

- Adapting to climate change
- Finance to enable action on mitigation and adaptation
- Mitigation (i.e. reduction) of greenhouse gas emissions
- Technology development and transfer to allow green development

The Kyoto Protocol

The Kyoto Protocol is an international treaty which extends the 1992 United Nations Framework Convention on Climate Change (UNFCCC) that commits State Parties to reduce greenhouse gas emissions, based on the premise that :

(a) global warming exists and

(b) human-made CO_2 emissions have caused it.

The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005.

Mandatory targets on greenhouse-gas emissions for the world's leading economies which have accepted it.

The Kyoto Protocol

"Carbon Market" : The Protocol allows countries that have emissions units to spare -- emissions permitted them but not "used" -- to sell this excess capacity to countries that are over their targets.

The Kyoto Protocol set a 5% reduction below 1990 levels for the first commitment period (2008-2012).

The UK's commitment under the Protocol was a 12.5% reduction and has been achieved, with emissions being reduced by 27% by 2011.

The Paris Agreement

On 5 October 2016, the threshold for entry into force of the Paris Agreement was achieved.

The Paris Agreement entered into force on 4 November 2016.

The Paris Agreement is a **bridge between today's policies and climate-neutrality before the end of the century.**

The Paris Agreement

Mitigation: Reducing Emissions

Governments agreed

- A long-term goal of keeping the increase in global average temperature to well below 2°C above pre-industrial levels;
- To aim to limit the increase to 1.5°C, since this would significantly reduce risks and the impacts of climate change;
- Rapid reductions in accordance with best available science.

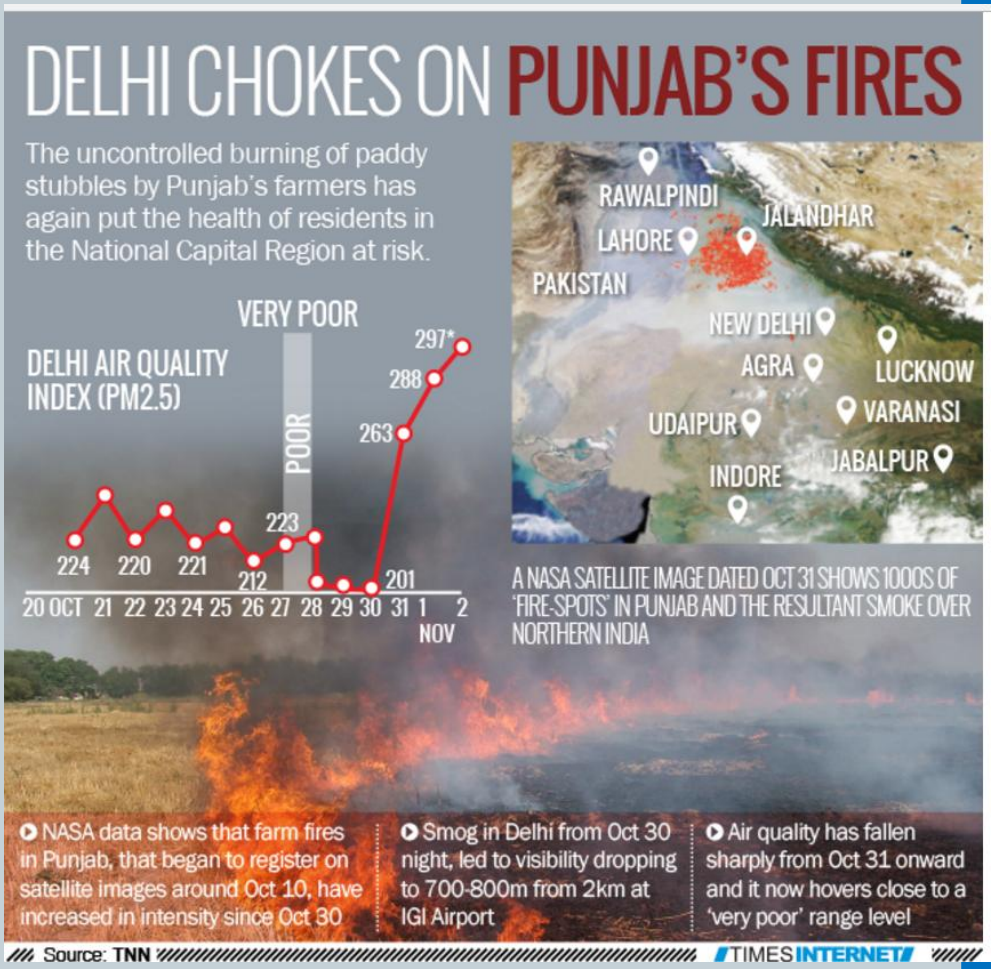
The Paris Agreement

- Transparency and global stocktake
- Adaptation
- Loss and damage
- Role of cities, regions and local authorities
- Support

Planning Parameters Related to Climate Change

Regional Level Planning

- Regional planning concepts and policies have a very storing influence on climate change.
- Recent examples of increasing the air pollution in New Delhi area are not just because of various activities taking place in Delhi but also due to various activities taking place in and around Delhi even up to Punjab.



Planning Parameters Related to Climate Change

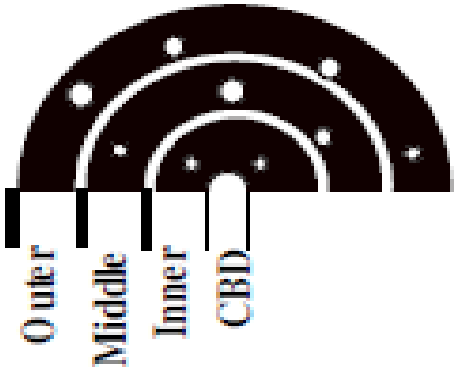
Effects of urban form on travel behaviour : vehicle kilometres travelled (VKT) –Energy Consumed(EC), and tailpipe emissions (CO2 ,NOx,PM, and CO)

Factors :

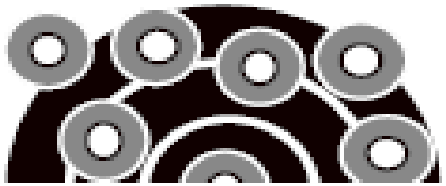
- Urban Form,
- Population ,
- Population Density,
- Employment Density,
- Land Use
- Distance from CBD

Planning Parameters Related to Climate Change

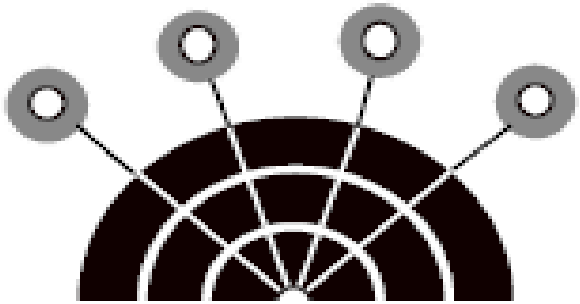
Urban Form



Business-As-Usual
(dispersed city)



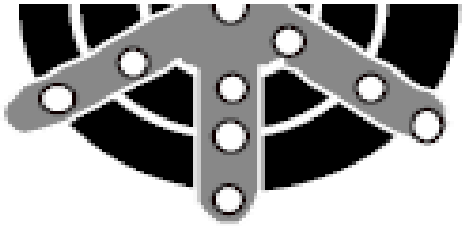
Edge City



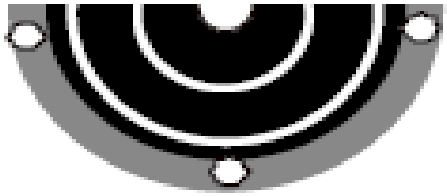
Ultra City

Compact City

Corridor City



Fringe City



Rings show zones of urban development; circles are activity nodes; shading indicates regions of concentrated expansion.

Planning Parameters Related to Climate Change

- Energy Consumed (EC) among residents living in peripheral areas(18km from CBD) = 2.5 * EC of residents in central area(1.2 km from CBD)
- Each **10% increase** in urban Density **reduces the vehicle kilometres travelled (VMT) per capita by 2-3 %**
- Central area Residents have **10-30% less VMT** than others
- Every **10ppha increase** in density , **EC decrease by 2%** per capita
- Every **10km increase** in distance from CBD; **EC increases by 10%**

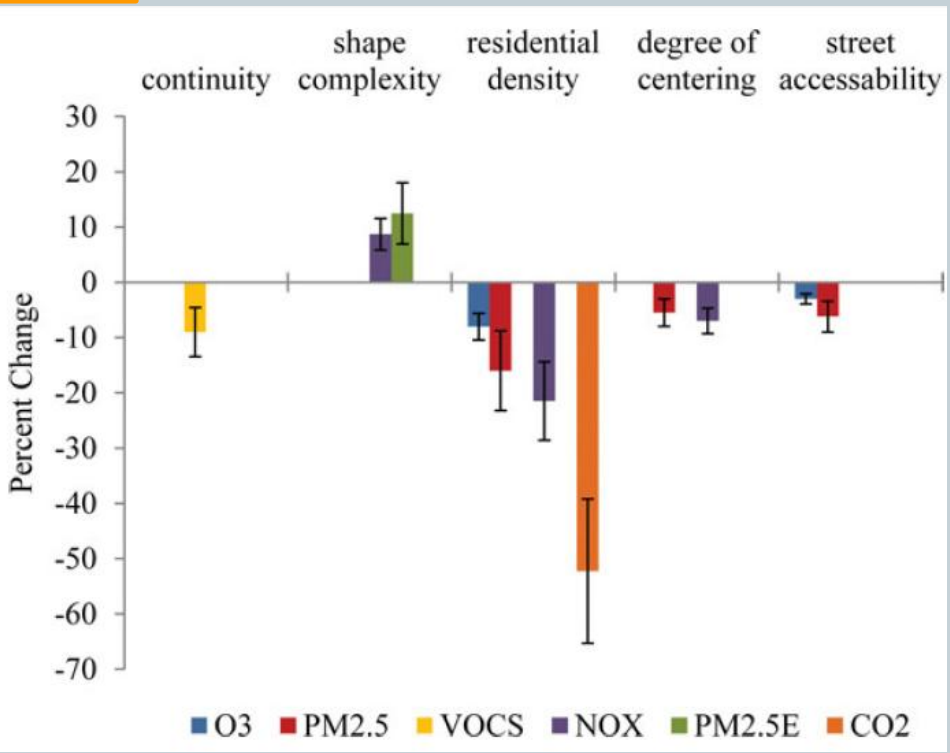
Source: Urban Structure and Travel behaviour Experiences from Empirical Research for Norway and Denmark by Peter Naess

Planning Parameters Related to Climate Change

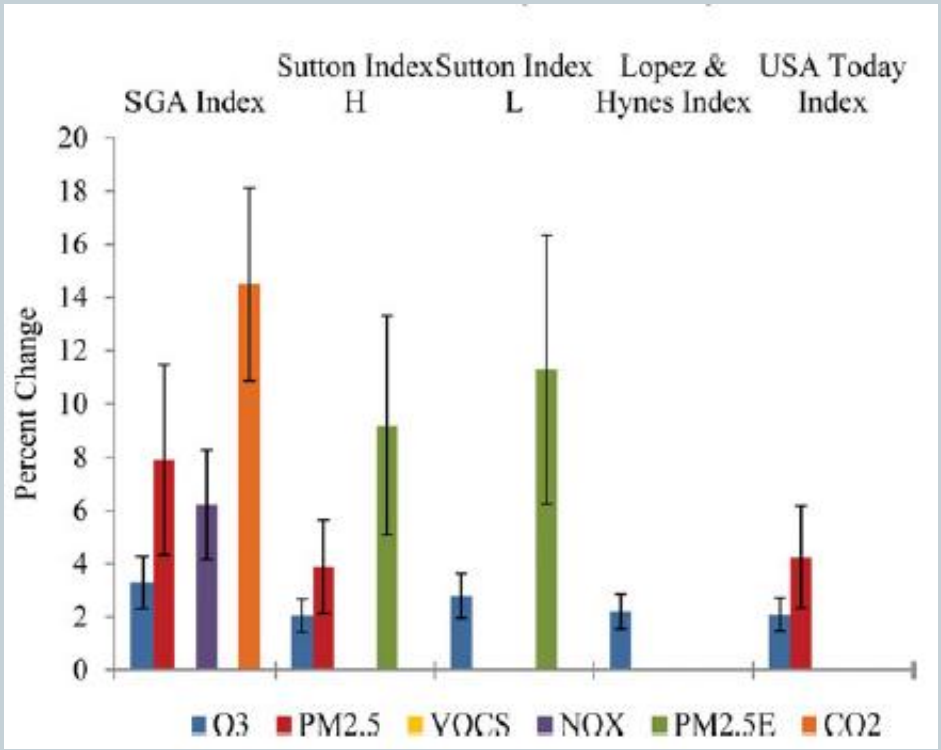
- Transport Emissions/capita is:
  - **directly proportional to ATL** of the city (a urban radius)
  - **Directly proportional to the Coefficient of Dispersion of employment** in the city.
- Cities from 10 - 20 lakh: shows **maximum growth in urban radius & produce maximum per capita transport emissions** (20 lakhs max. Threshold population for a monocentric city)
- Centralization/compactness matters as VKT increases with increase in Distance

Source: Urban Structure and Travel behaviour Experiences from Empirical Research for Norway and Denmark by Peter Naess

Planning Parameters Related to Climate Change



Percentage change in air pollutant concentrations and emissions for every one standard deviation increase in each individual measure of urban form.



Percentage change in air pollutant concentrations and emissions for every one standard deviation increase in each of five urban sprawl indexes

Source : Bradley Bereitschaft & Keith Debbage (2013) Urban Form, Air Pollution, and CO2 Emissions in Large U.S. Metropolitan Areas, The Professional Geographer, 65:4, 612-635

Planning Parameters Related to Climate Change

What roles can urban planning play ?

- Population Density
- Distance from CBD
- Distance from strategic
- Road network
- Jobs-housing balance
- Resident Location
- Local neighborhood streetscape layout.

Planning Parameters Related to Climate Change

Factors

- Population parameters
- Employment parameters
- Activity intensity parameters(population n & job/ ha)
- Vehicle ownership parameters
- Private mobility parameters
- Public transport parameters
- Traffic restraint parameters
- Transport energy parameters

Planning Parameters Related to Climate Change

Urban Form and Environmental Performance

Factors :

- Population Density
- Business as usual
- Compact City
- Edge City
- Corridor City
- Ultra City
- Fringe City

Planning Parameters Related to Climate Change

Urban Density

- Urban spatial organization can have a wide variety of implications for a city's greenhouse gas emissions.
- The high concentrations of people and economic activities in urban areas can lead to **proximity and agglomeration** that can have a positive **impact on energy use and associated emissions.**
- Proximity of **homes and businesses can encourage walking, cycling and the use of mass transport** in place of private motor vehicles.

Reference: URBAN DENSITY AND CLIMATE CHANGE, by David Dodman (2009)
United Nations Population Fund (UNFPA) Analytical Review of the Interaction between Urban Growth Trends and Environmental Changes

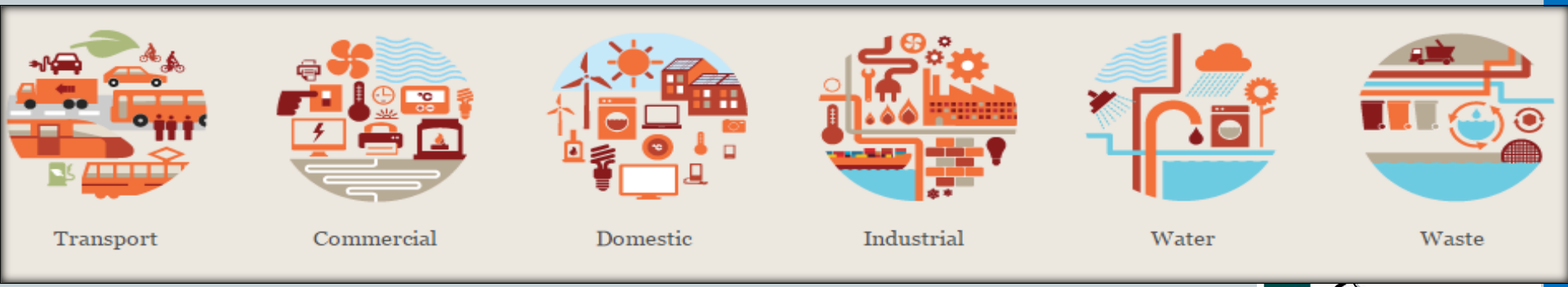
Planning Parameters Related to Climate Change

Smart Cities

- Smart Cities promise both a sustainable energy solution to the challenges of the urban environment and improved quality of life for the millions of city-dwellers across the world.

- Cities are responsible for maximum world's energy consumption and most of the world's carbon emissions

- As a result, cities are central to the world's efforts to shift to a lower carbon development path.



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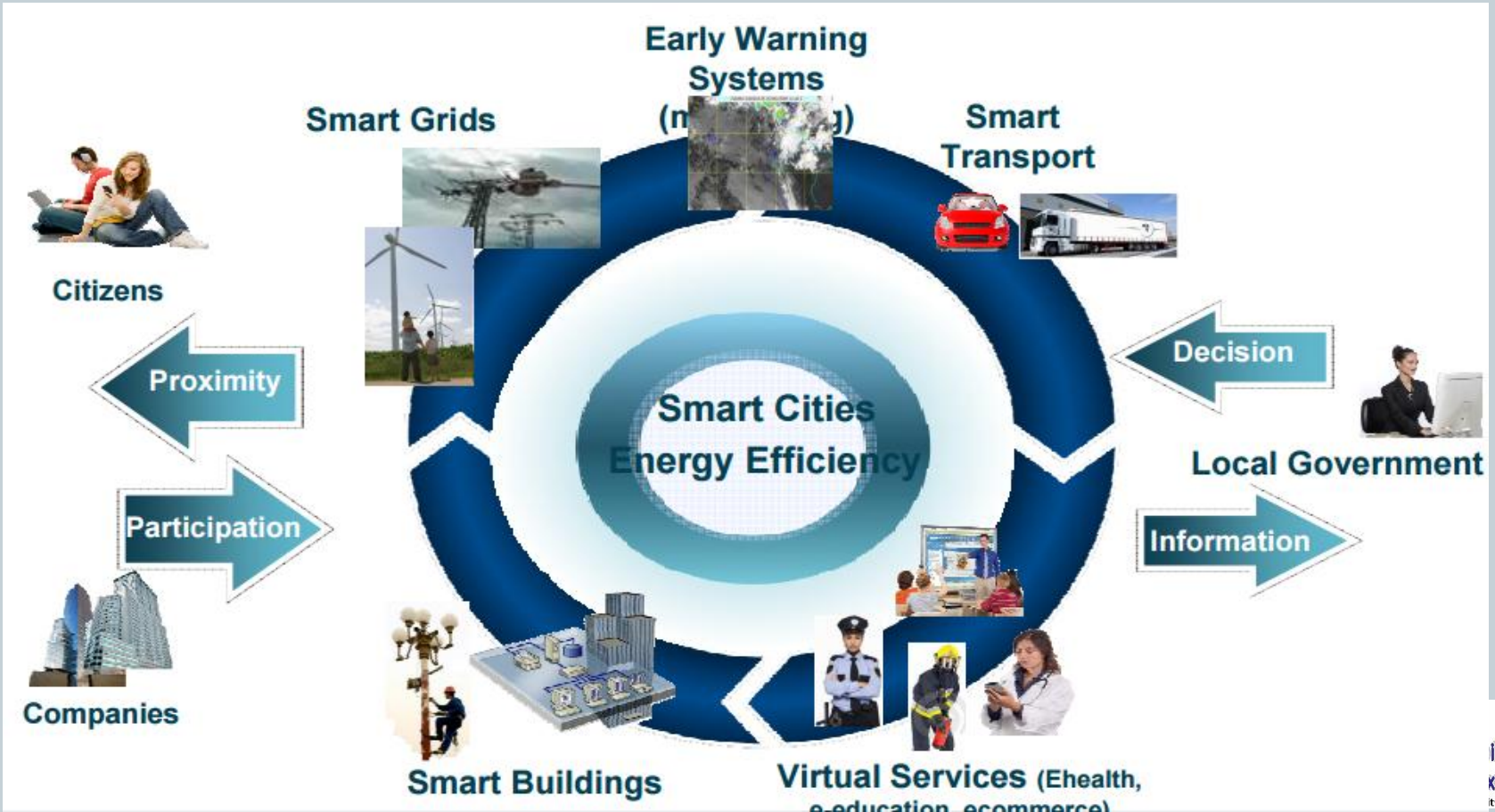
Planning Parameters Related to Climate Change

Intensive use of **Information and Communication Technologies (ICTs)** is a gift that facilitate information gathering from different interoperable systems, to make better decisions and promote energy efficiency.



Planning Parameters Related to Climate Change

Transit Oriented Development (TOD)

- Transit-oriented development, or TOD, is an approach to development that focuses land uses around a transit station or within a transit corridor

- By developing more "urban-scale" buildings with reduced parking ratios and ready access to transit, TOD improves air quality and reduces auto traffic congestion.

- Studies indicate that TOD can reduce traffic congestion and air pollution by up to 25 to 50 percent compared to typical suburban development.

Reference: URBAN DENSITY AND CLIMATE CHANGE, by David Dodman (2009)
United Nations Population Fund (UNFPA) Analytical Review of the Interaction between Urban Growth Trends and Environmental Changes

Planning Parameters Related to Climate Change

Transit Oriented Development (TOD)

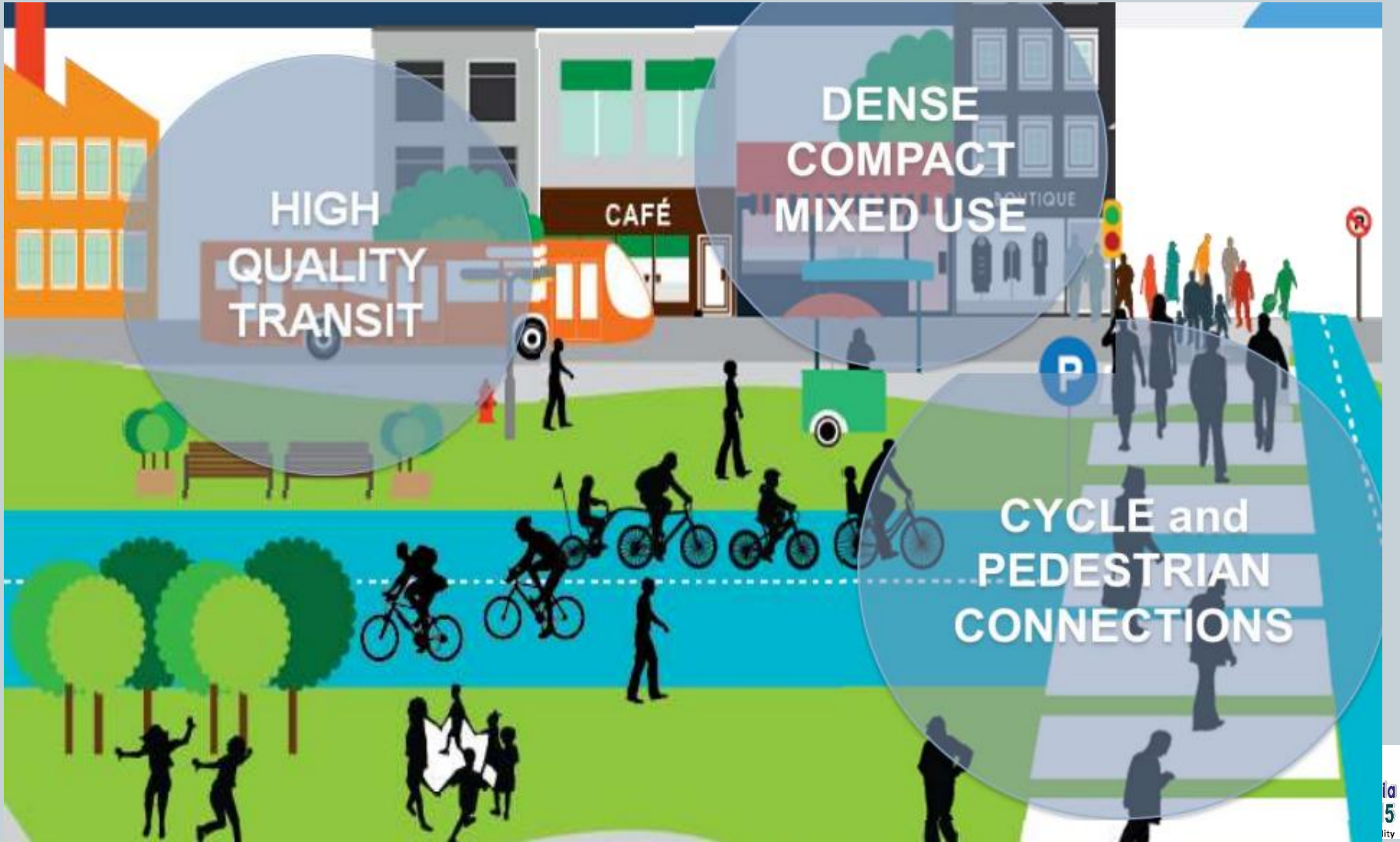
Benefits of TOD over climate change

- Reduces trip lengths, implies lesser vehicular emission
- Increase walking and transit use, implies less use of motor vehicles
- Enhances pedestrian and regional accessibility.
- Increases land value around the transit corridor, which helps generate the funds for promoting environmental awareness and controlling environmental pollution.

Reference: URBAN DENSITY AND CLIMATE CHANGE, by David Dodman (2009)
United Nations Population Fund (UNFPA) Analytical Review of the Interaction between Urban Growth Trends and Environmental Changes

Planning Parameters Related to Climate Change

Transit Oriented Development (TOD)



Planning Parameters Related to Climate Change

NON - Transit Oriented Development (N- TOD)

Transport and emissions – Need for an action plan

Some key actions include :

- **Mode shifting**

from road based transport – to Rail and IWT and also from Personal vehicles to Public transport and NMT

- **Improving vehicle efficiencies and fuel quality**

through fuel economy standards for manufacturers, and establishing efficient monitoring systems encouraging growth of cleaner fuels

- **Alternate technology and source of fuels**

And promoting shift to **such** modes

Transport and emissions – Need for an action plan

- Increasing the frequency and commercial speeds of passenger train services
- Increasing rail based intra urban, regional and suburban transport
- Increase the Share of Rail in Freight Movement
- Increase the Share of Public Transport
- Increase non-motorized transport share
- Improving efficiency of vehicles

Transport and emissions – Need for an action plan

- Advanced Vehicles and Fuel technology

Incorporation of alternate/ hybrid technologies like :

Pure EV , **- Hybrid Gasoline**

Hybrid Diesel **- Plug-in Hybrid Gasoline**

Plug-in Hybrid Diesel **- CNG and LPG**

Hydrogen Hybrid ICE **- Hydrogen Fuel Cell**

- Along with development of assistive infrastructure and network

Transport and emissions – Need for an action plan

- Increase the availability and use **of lower-carbon fuel**.
- Key focus should be on comprehensive planning of new communities, or the redevelopment; focusing on mixed-uses with access to mass transit – TOD and DOT
- **Use of ITS** for better management of logistics and transport use; reducing congestion and optimising fuel use.

International Best Practices - Berlin

MODERN RAIL TRANSPORT

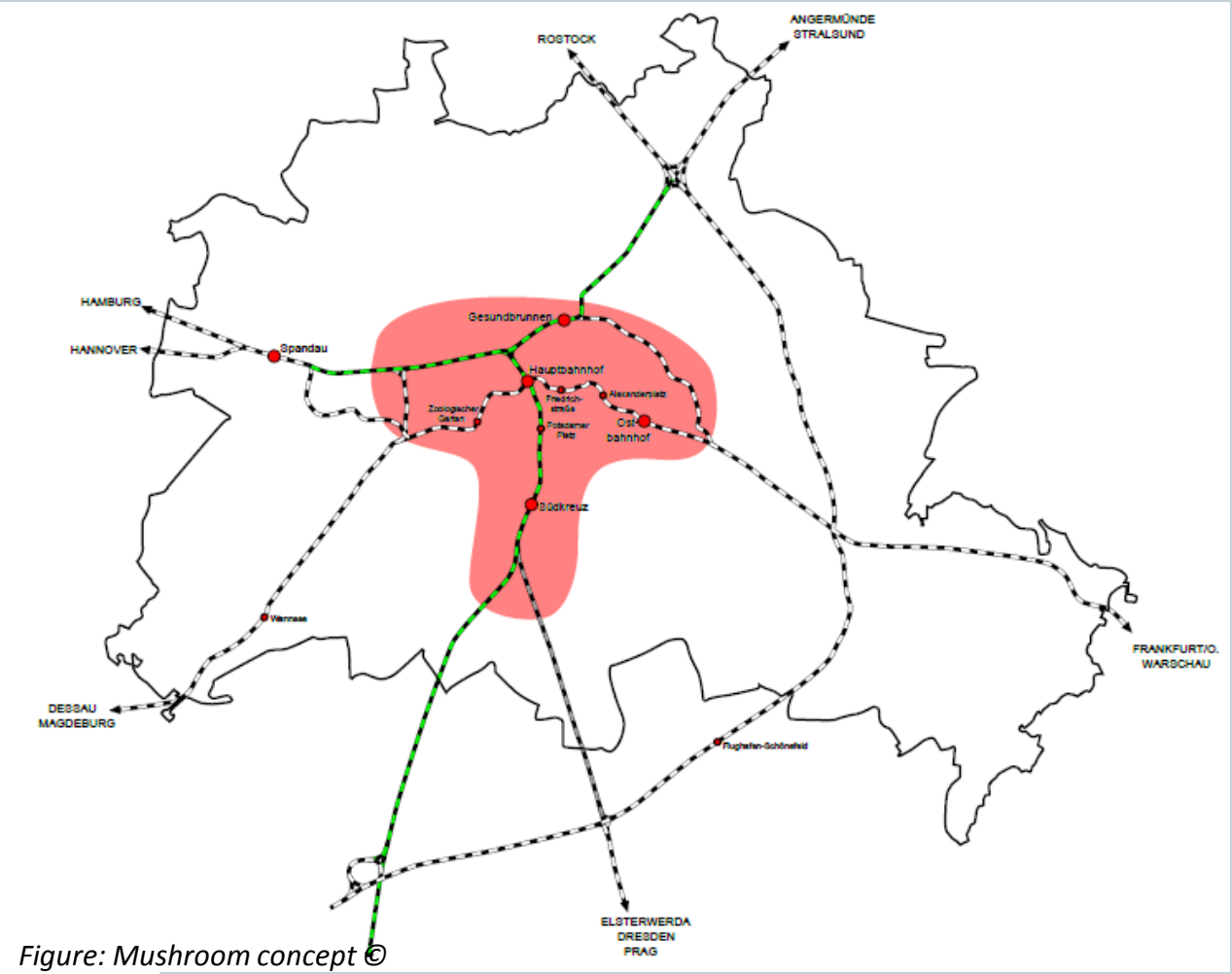


Figure: Mushroom concept ©
http://commons.wikimedia.org/
wiki/File:Pilzkonzept.svg

'mushroom concept' was developed.

Comprises the main central station and five other main line stations

International Best Practices - Berlin

Berlin is a hugely bike-friendly city

720 bicycles for every 1 000 inhabitants

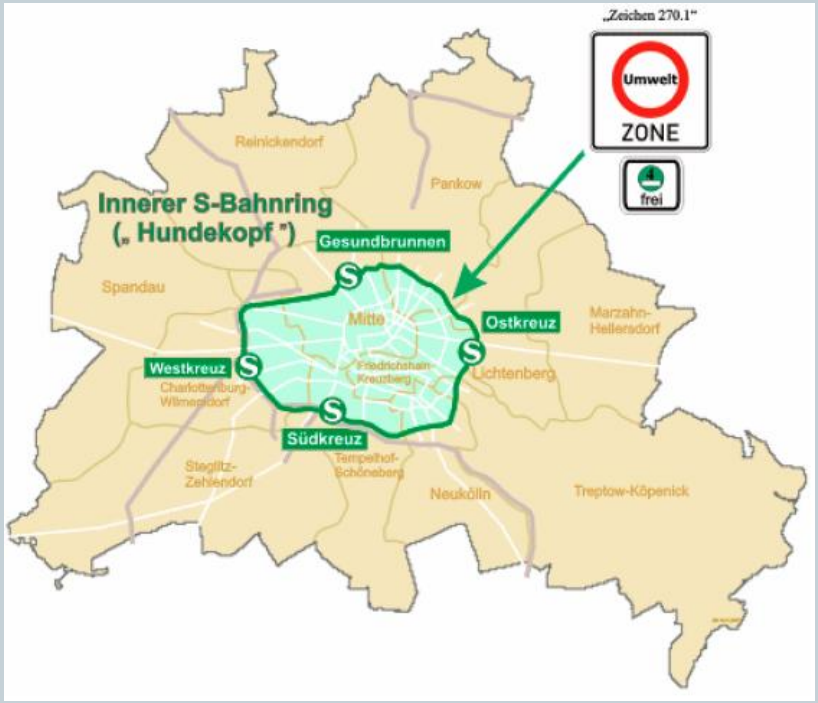
Around **1.5 million trips a day**

- **650 kilometres of bike paths and 175 km of bike lanes on main roads**.
- About **70 % of the 5 400 km road** network is made up of **side streets** with a **30 km/h speed limit**, which makes them **ideal for cycling.**

- **Has new signposts exclusively for cycle traffic.**
- **Bicycle parking facilities at public transport stops** are an **important part of public infrastructure**.

International Best Practices - Berlin

LOW EMISSION ZONE (LEZ)



sticker:	2 S-UM43	3 S-UM43	4 S-UM43
minumum criteria for Diesel vehicles	Euro 2, or Euro1 plus particle filter	Euro 3, or Euro 2 plus particle filter	Euro 4, Euro 3 plus particle filter
ban for Diesel veh. older than …	1992	1996	2000
minimum citeria for petrol cars			Euro 1 plus catalytic converter

Figure : Low emission zone inside the S-Bahn ring in Berlin

Source: Senate Department for Urban Development and the Environment (2013): http://www.stadtentwicklung.berlin.de/umwelt/luftqualitaet/ mweltzone/de/ gebiet.shtml

International Best Practices - Berlin

Phase 1

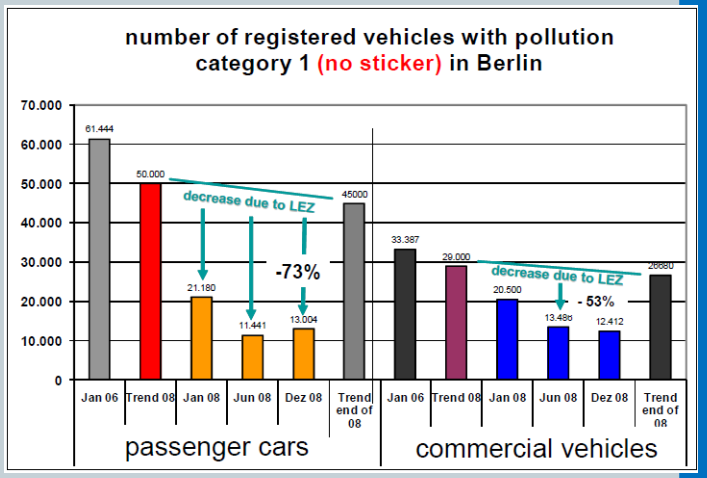
Initially vehicles with the highest emissions were prohibited, and the other three categories – **red, yellow and green** – were **still allowed** to enter the low emission zone.

Phase 2

Vehicles that have a green sticker, i.e. **The cleanest category of vehicles at present, are allowed within the zone.**

Result:

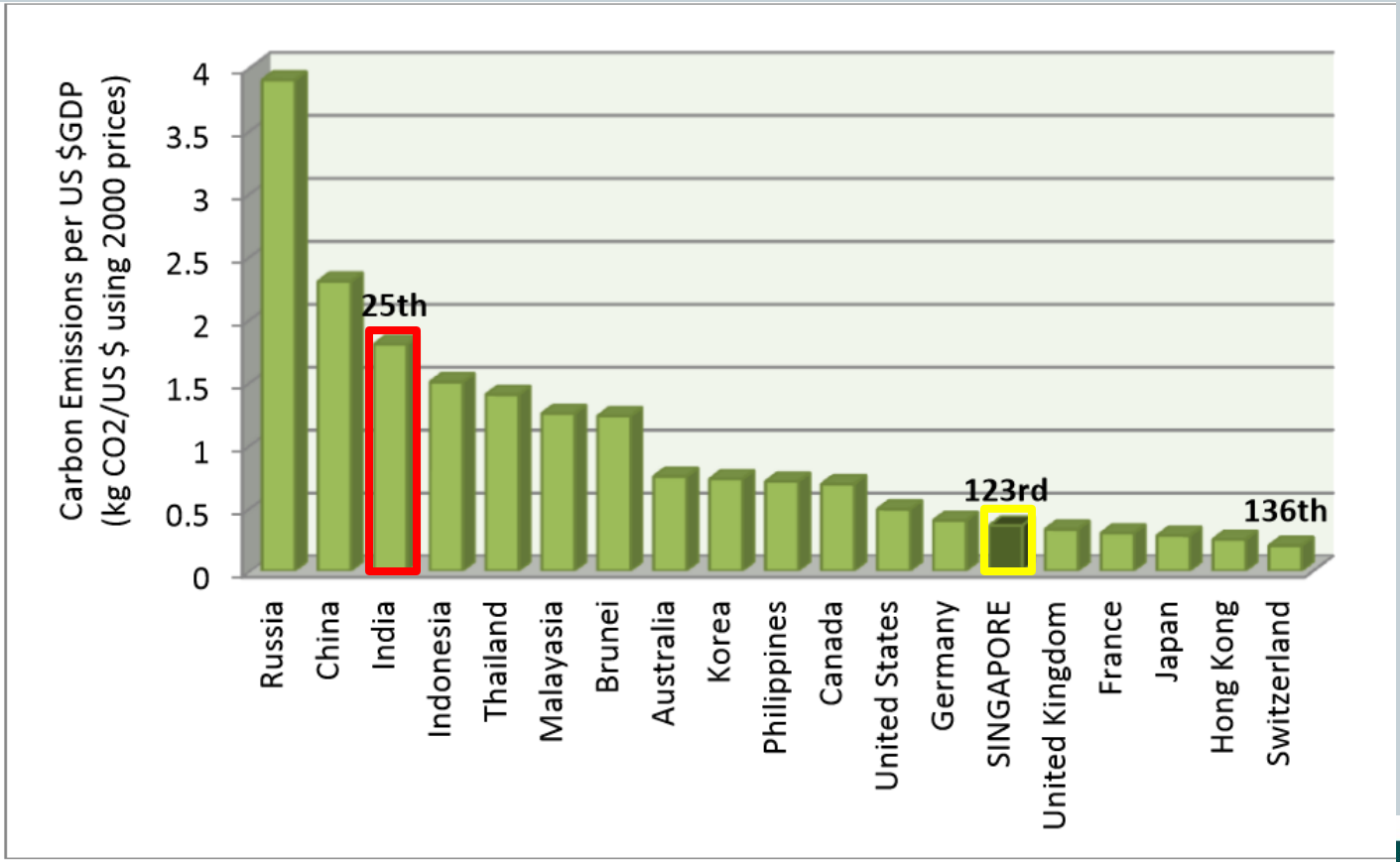
- **replacement of old vehicles** by low-emission ones.
- **particulate emissions 50 % lower** than the predicted trend
- **Nitrogen dioxide emissions 20 % lower.**



International Best Practices - Singapore

Singapore contributes less than **0.2%** of global emissions.

Singapore's contribution in producing CO_2



Source: CO_2 emissions for fuel consumption, 2011 highlights – OCED/International Energy Agency

International Best Practices - Singapore

1. Vehicle Ownership: The Vehicle Quota System

2. Electronic Road Pricing (EPR)

3. Use of less polluting energy sources

International Best Practices - Denmark

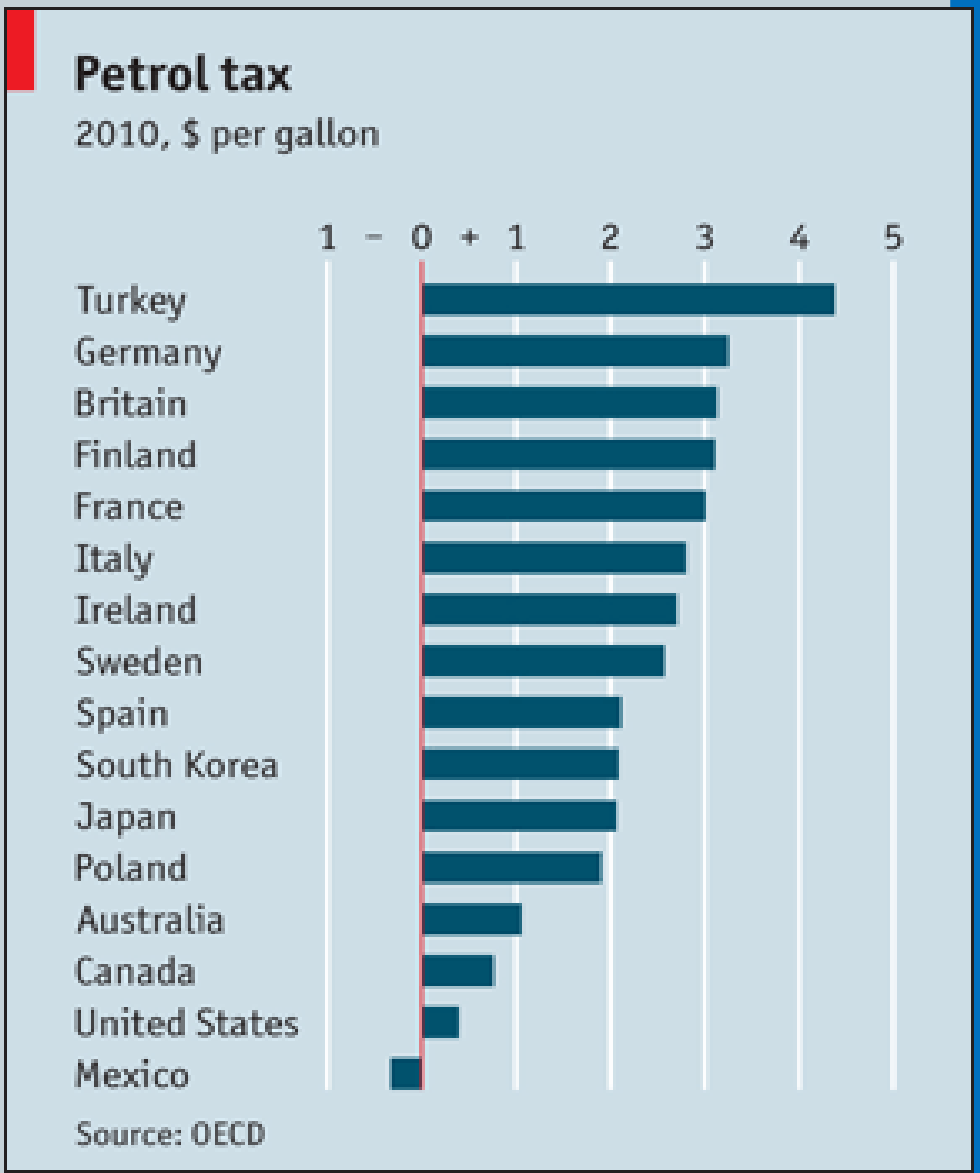
- Taxation
- Taxes (comprising an energy tax, NOx tax and a CO2 tax) are approx. 92DKK/GJ for diesel and approx. 134 DKK/GJ for gasoline.
- **Despite this high tax level, the use of fuels for transport has been growing steadily** during the last 40 years, from 140 PJ in 1972 to 210 PJ today.
- The share of renewable energy is very small- **only 3% in 2011**.
- The reasons for this low share of renewable energy and electric vehicles is that it is in general **more expensive to use renewable energy within the transport sector** than in other sectors.

International Best Practices

Policy of tax incentives

If the emission level of a purchased new automobile is lower than a state-declared emission standard, the purchaser can be exempted from certain taxes.

This has been adopted in Germany, the Netherlands, and Sweden, and has proven efficient and effective.



Way forward

- Fuel economy standards .
- Integration of land-use and transport.
- Requirement of Comprehensive Mobility Plan.
- Funding for transport linked to compliance with NUTP.
- Investment on public transport and NMT.
- Promoting mass transit.
- Cities to adopt PT as per their form and size.
- Promoting coastal shipping and water ways.
- Increased allocations for augmenting rail capacity.

Policy and Strategies

- Not just high density but improved accessibility too.
- Plan formulation at different levels neighbourhood – city- regional - national.
- To fix benchmarking of planning parameters but with the given form of city.
- To make pedestrian facility infrastructure plan mandatory
- CMP to have essential component of Environmental Quality Index.
- Formulation of Energy Policy

Policy and Strategies

- New Automobile policy
- Regional climatic region(RCR) and Environment Quality Index(EQI)delineation
- Congestion pricing
- Trip/Travel management and not traffic management
- Car Pooling/HOV policy
- Incremental policy for vehicle registration.
- Creation of separate environment fund along with safety fund
- Policy of Carbon credit
-

Barriers

- Massive funding requirements
- Fragmented responsibility.
- Capacity at city / municipal levels to conceive and implement projects.
- Focus on physical infrastructure.
- Lack of standardisation and replicability.
- Inadequate Infrastructure.

Learn lesson from diabetic management

Towards Clean Environment

THANK YOU….