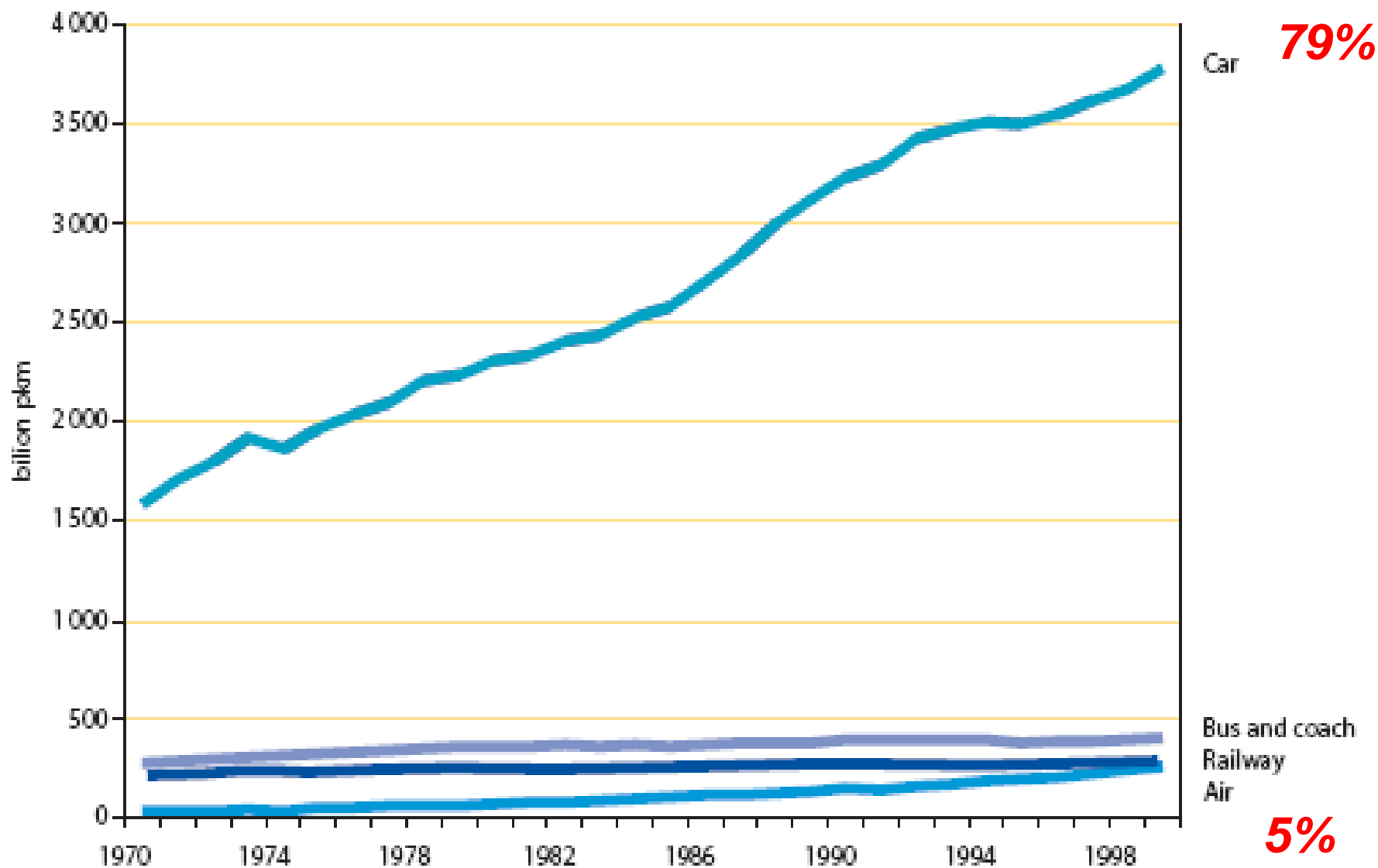


4.

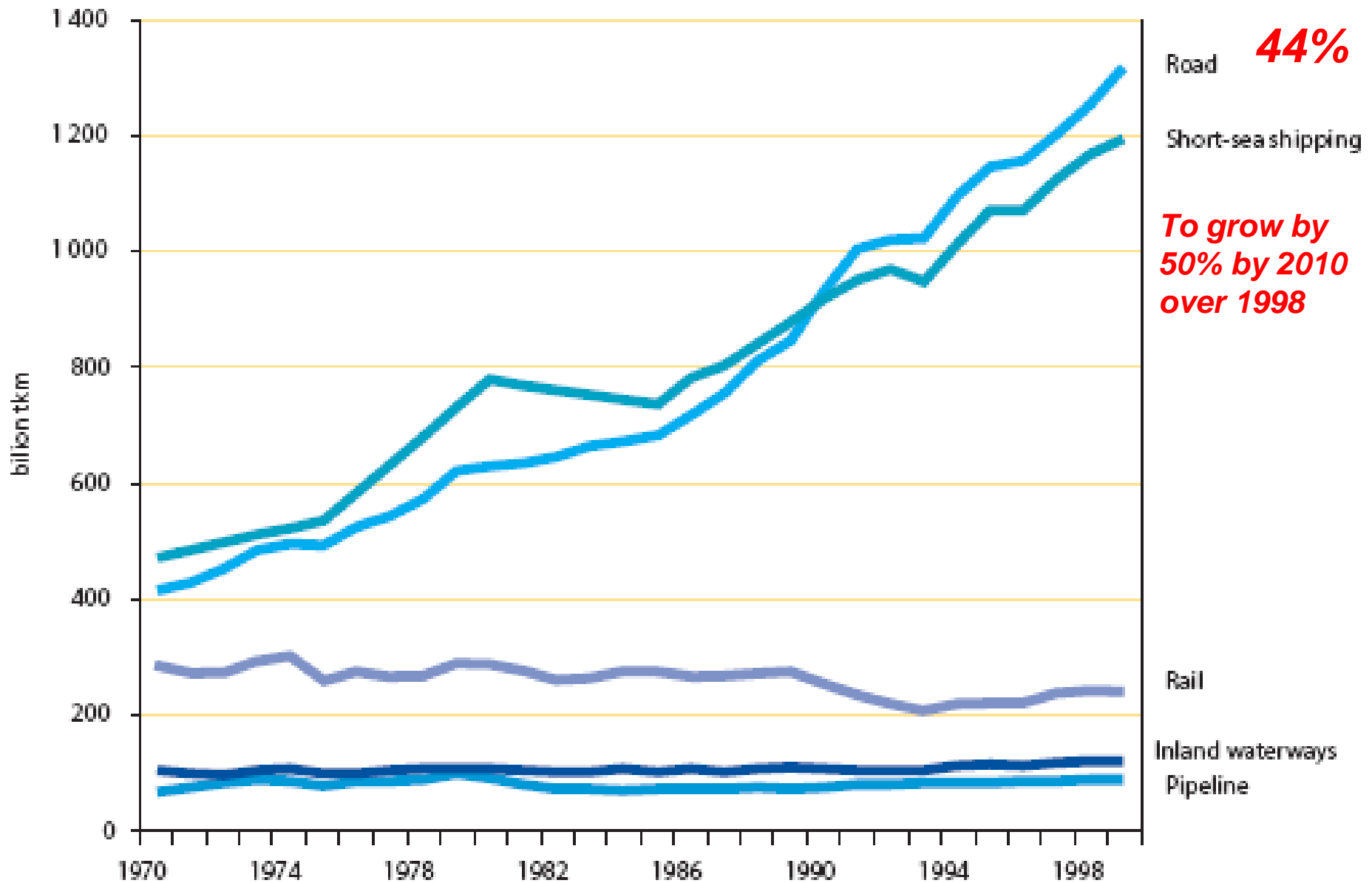
# The role of fleets and fleet managers

**Fig. 1 — Passenger transport — Growth of traffic by mode of transport, EU-15: 1970–1999**



Passenger kilometre: transport of a passenger over one kilometre

**Fig. 2 — Goods transport — Growth of traffic by mode of transport, EU-15: 1970–99**



**44%**

Road

Short-sea shipping

**To grow by  
50% by 2010  
over 1998**

Rail

Inland waterways

Pipeline

Tonne kilometre: transport of one tonne over one kilometre

# Role of Fleets

- Changing operating environment: national, local government incentives, disincentives
- Economies of scale
- Visibility
- Road contribution to local and global air pollution only set to grow – more attention
- Proactive approach often rewarded

# The value of clean fleet management

- ✓ Reduce air pollution from your fleet
- ✓ Reduce greenhouse gas emissions
- ✓ Improve corporate social responsibility
- ✓ Lower the cost of your operations through fuel savings – ***the business case***
- ✓ Extend vehicle life through improved maintenance, cleaner fuel use, and driver training
- ✓ Improve your environmental profile and overall efficiency of operations

# About the Cleaner Fleet Management Toolkit

Developed by the United Nations Environment Programme (UNEP) and TNT in 2006 - field tested by TNT Turkey and humanitarian aid fleets

The toolkit contains a number of tools that help fleet managers to:

- ✓ **evaluate the impacts** of their fleets on the environment and human health, and
- ✓ with minimal information and inputs, **develop practical strategies** and scenarios for corrective and cost-effective action

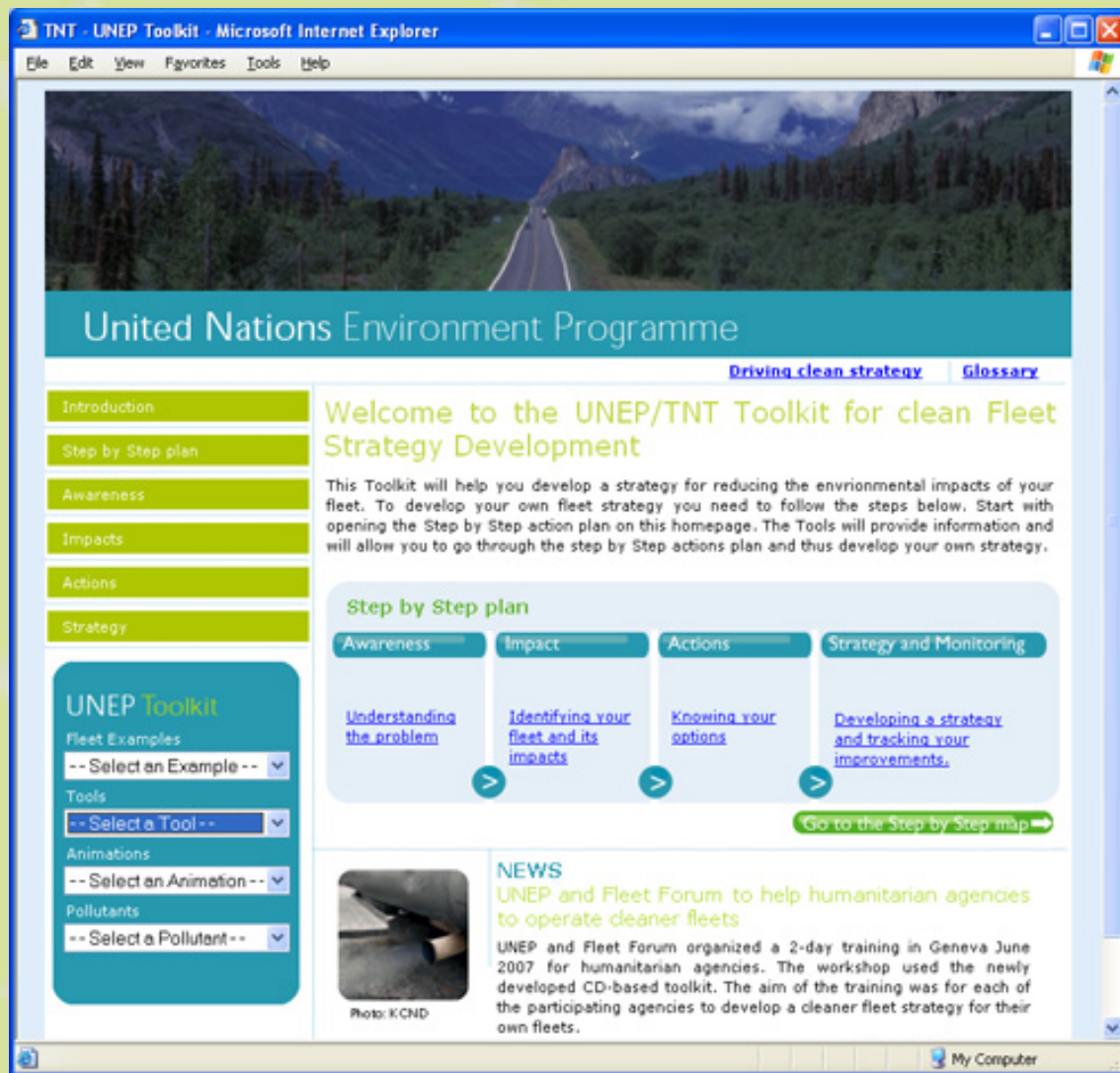
*The toolkit is a step-by-step system for beginner and experienced users and managers*

# Easy to use

- ✓ Available online at [www.unep.org/pcfv](http://www.unep.org/pcfv)
- ✓ **Or** on CD - no internet connection required
- ✓ CD tools launch in Web Browser and Excel
- ✓ Flexibility of use:
  - \* Start with the basics

*Or*

  - \* Start strategizing your cleaner fleet with fleet inventory Tool 18



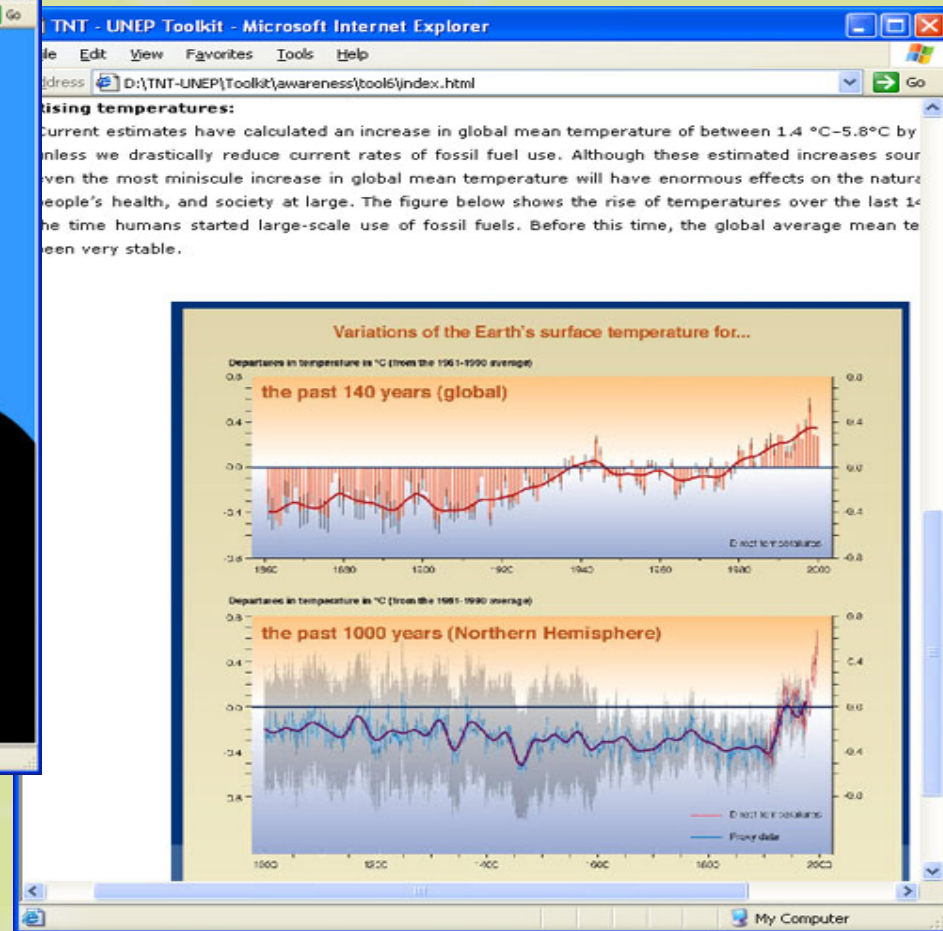
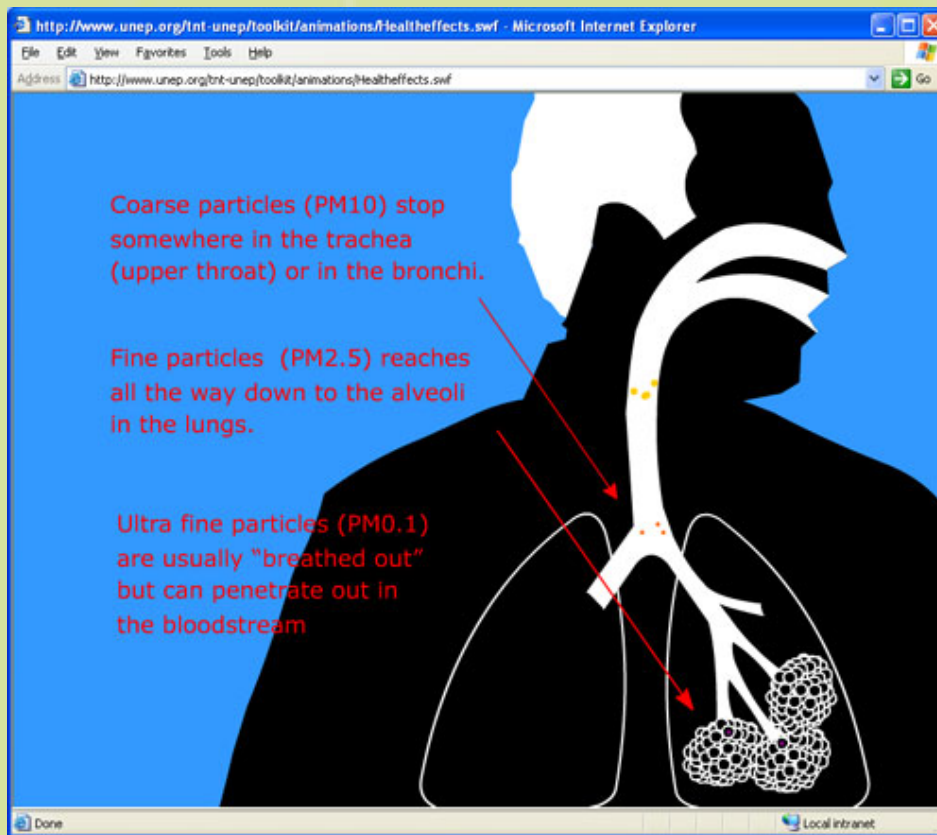
The screenshot shows a web browser window titled "TNT - UNEP Toolkit - Microsoft Internet Explorer". The page features a header with a landscape image and the text "United Nations Environment Programme". Below the header, there are navigation links for "Driving clean strategy" and "Glossary". A left sidebar contains a menu with items: "Introduction", "Step by Step plan", "Awareness", "Impacts", "Actions", and "Strategy". The main content area is titled "Welcome to the UNEP/TNT Toolkit for clean Fleet Strategy Development" and includes a paragraph explaining the toolkit's purpose. Below this, a "Step by Step plan" section displays four steps: "Awareness" (Understanding the problem), "Impact" (Identifying your fleet and its impacts), "Actions" (Knowing your options), and "Strategy and Monitoring" (Developing a strategy and tracking your improvements). A "Go to the Step by Step map" button is located at the bottom of this section. A "NEWS" section at the bottom right features a photo of a person and a headline: "UNEP and Fleet Forum to help humanitarian agencies to operate cleaner fleets".

# Step by step for cleaner fleets



# Reference info on pollutants and impacts

Clear, concise explanations and animations of health and environmental impacts - including climate change and particulate pollution...



## Tool 6: Climate change and the greenhouse effect:

*An increasing level of carbondioxide in the atmosphere stops more of the solar heat from leaking out into space and thus heats the earth slowly.*

*This is called the human induced greenhouse effect.*

*Continue>*



# Practical fleet inventory and impacts

Microsoft Excel - inventoryoptions

File Edit View Insert Format Tools Data Window Help Adobe PDF

E20 13700

**Inventory - Your fleet**  
Fill in the vehicle, kilometres, and fuel data in the table below (imagina

	Numbers	Kms per year	Fuel consumption per year (litres)
Pass. cars petrol without catalyst	4	5,567,000	445,400
Pass. cars petrol with 3-way catalyst	54	3,093,000	185,500
Pass.car diesel - old	3	42,375	3,186
Pass.car diesel with PM filter (New)	8	136,992	8,203
Light duty trucks pre Euro	0	0	0
Light duty trucks Euro I+II	45	317,500	47,600
Light duty trucks Euro III+IV	23	25,750,000	3,090,000
Light duty trucks HEV	0	0	0
Heavy duty trucks pre Euro	9	37,964	9,861
Heavy duty trucks Euro I+II	34	6,210,800	2,546,400
Heavy duty trucks Euro III+IV	25	2,587,800	905,700
Heavy duty trucks Euro V	0	0	0
Motorcycles with 4-stroke engines	27	229,400	9,180
Motorcycles with 2-stroke engines	12	458,700	13700
<b>Total</b>	<b>244</b>	<b>44,431,531</b>	<b>7,264,730</b>

Welcome \ Fleet Inventory \ Impacts - Your emissions \ Impacts - Air

Edit NUM

- ✓ Fill in *basic* fleet data like number of vehicles and fuel consumption
- ✓ Built-in calculators do the work for you

# Calculate fleet emissions

Microsoft Excel - inventoryoptions

File Edit View Insert Format Tools Data Window Help Adobe PDF Type a question for help

L26

Impacts - Estimating your emissions **GO BACK**

	Numbers		Air Pollution (in tonnes)					Climate Change (in tonnes)
	Numbers	km/year	CO	VOC	NO <sub>x</sub>	SO <sub>x</sub>	PM10	CO2
Pass.cars without catalyst	4	5,567,000	295.05	49.21	14.03	0.28	0.06	1,047
Pass.cars with 3-way cat.	54	3,093,000	55.67	2.41	3.62	0.15	0.03	436
Pass.car diesel - old	3	42,375	0.15	0.08	0.07	0.01	0.01	8
Pass.car diesel with PM filter	8	136,992	0.49	0.04	0.12	0.02	0.01	21
Light trucks pre-Euro	0	0	0.00	0.00	0.00	0.00	0.00	0
Light trucks Euro I-II	45	317,500	1.14	0.06	0.52	0.08	0.04	124
Light trucks Euro III-IV	23	25,750,000	92.70	4.89	42.23	6.44	3.35	8,034
Light trucks HEV	0	0	0.00	0.00	0.00	0.00	0.00	0
Heavy trucks pre-Euro	9	37,964	0.33	0.06	0.58	0.00	0.03	26
Heavy trucks Euro I-II	34	6,210,800	53.35	10.25	93.22	4.29	4.16	6,621
Heavy trucks Euro III-IV	25	2,587,800	13.84	2.98	23.81	1.79	0.75	2,355
Heavy trucks Euro V	0	0	0.00	0.00	0.00	0.00	0.00	0
Motorcycles 4-stroke	27	229,400	3.67	1.15	0.23	0.00	0.05	22
Motorcycles 2-stroke	12	458,700	12.61	6.61	0.07	0.00	0.16	32
<b>Total</b>	<b>244</b>	<b>44,431,531</b>	<b>529</b>	<b>78</b>	<b>179</b>	<b>13</b>	<b>9</b>	<b>17,072</b>

Ready

Your Fleet Emissions May Consist of:

CO<sub>2</sub>: 17072 ton

NO<sub>x</sub>: 179 ton

PM<sub>10</sub>: 9 ton

Data Window Help Adobe PDF Type a question for help

Impacts: Air Pollution and Health Impacts **Go**

Your fleet emits: **9** tonnes of PM → For example, if this would be emitted in The Netherlands,

it is estimated to cause: **3.5** premature deaths/year **In addition, many more people are affected with other diseases such as non-fatal cancers, bronchitis, and cardio-vascular diseases (heart and lung).**

*The effects of your vehicle emissions are strongly dependent on where the emissions occurs.*

Emissions in a city center have more health impacts than similar emissions in rural areas as more people are exposed.

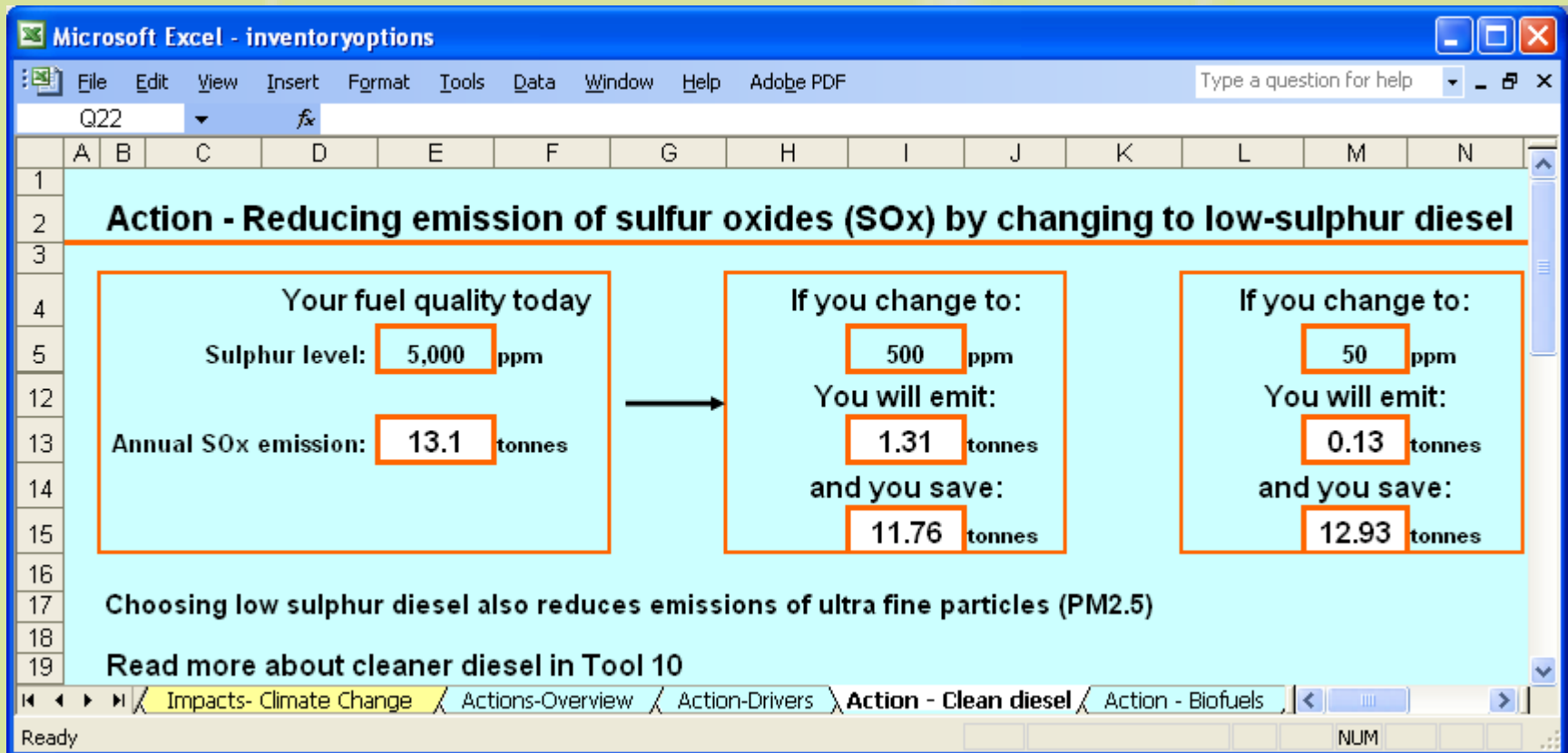
As an example, emissions in Paris are estimated to have 10 times more health impacts than emissions occurring in rural areas.

Ready

But what are the real-world effects of 9 tons PM<sub>10</sub>? The Toolkit explains impacts in terms of human health and environment.

# Evaluate your options...

And develop your own tailor-made strategy by comparing the costs and benefits of potential actions – from simple maintenance, to eco driving, to advanced fuels and vehicle technologies.



# Clean Fleet Options to consider...

- *Environment*

- Fuels – unleaded, low sulphur, biofuels
- Maintenance - condition (tires, oil), I&M, driver training, monitoring & evaluation, etc.

- *Fleet*

- Characteristics
- Turn over
- Investment opportunities - (Euro emissions standards, 4-strokes, low emissions - no emissions?)

- *People*

- Awareness
- Commitment
- Training

	Options	Air pollutant reduction	CO2 emissions reduction	Fuel savings
Drivers & Maintenance	Optimal tyre pressure+ alignment	2 - 4%	2 - 4%	2 - 4%
	Improved maintenance	up to 20%	up to 7%	up to 7%
	Eco-driving	5 - 10%	5 - 10%	5 - 10%
Fuel	Use unleaded petrol	Eliminating lead particles	none	none
	Use ultra low sulphur diesel	Reduces SOx and ultra fine particles	none	none
	Biodiesel	Eliminating SOx	~60% (life cycle emissions)	none
	Bioethanol	0 - 5% depending on vehicle technology	~60- 65% (life cycle emissions)	0 - 5%
In-use Vehicles	Diesel Oxidation Catalyst	20-60% depending on which pollutants	none	none
	Diesel Particulate Filter	50-90% depending on which pollutants	none	none
New Vehicles	Euro V Diesel trucks	~90% compared with pre-euro	none compared to diesel, 15% comp. to petrol	none compared to diesel, 20% comp. to petrol
	HEV with emission controls	>90% compared with pre-euro	25 -35%	25 -35%
	CNG with emission controls	>90% compared with pre-euro	5 -10%	10% INCREASE
	Fuel Cell with renewable hydrogen	99% compared with pre-euro	100% possible	~ 50%

# ... and savings

✓ Promoting simple measures including eco-driving and better maintenance can reduce 10-15% of harmful emissions and fuel cost

✓ **TNT Turkey:**

- 80 TNT Turkey drivers trained on eco and safe driving
- 122 vehicles (41%) replaced with cleaner models
- Monthly CO2 emission per vehicle dropped 15% in 16 months
- Fuel cost savings 100,000 Euro




*First hybrid car in Turkey*

# Case studies to guide you

TNT - UNEP Toolkit - Microsoft Internet Explorer

## United Nations Environment Programme

[Print Vers](#)



**UPS in the US – CNG and maintenance strategy**

In the US, UPS has adopted an environmental strategy focusing on four different components: recycling and reuse; alternative fuels; fleet management; and facility initiative. Recycling and facility initiatives take place primarily within UPS offices, whereas the alternative fuels and maintenance programmes focus on the vehicle fleet.

**UPS alternative fuel strategy:**

UPS has been testing CNG delivery trucks since 1989, and today UPS has the largest fleet of CNG vehicles in the US – over 1000 vehicles. UPS has also hybrid trucks, propane trucks, and they are in the process of testing fuel cell vehicles and electric vehicles. However, the current focus is on their CNG vehicles.

Experiences derived from using this CNG fleet have been evaluated externally by the US Department of Energy, and overall, the results have been positive:

- CNG trucks have reportedly reduced emissions of air pollutants significantly.
- Fuel consumption was, however, 40% higher per km, based on energy content, but CO<sub>2</sub> emissions were equivalent to diesel vehicles due to the lower carbon content in natural gas. Newer models of CNG trucks are expected to be significantly more fuel-efficient and thus emit less greenhouse gases than comparable diesel trucks.

Table: Health Effects	People Affected
Premature Mortality	
Respiratory Symptoms	
Lower Respiratory Infections	
Asthma Attacks	
Chronic Bronchitis	
Hypertension	
Non-fatal Heart Attacks	
IQ Decrement	
Respiratory Hospitalizations	
Emergency Room Visits	
Restricted Activity Days	5 900 000

Sources: Ostro (1994) and Resosudamo (1996) presented in the Integrated Vehicle Emission Strategy Workshop October 16-18, 2001, Jakarta, Indonesia

My Computer

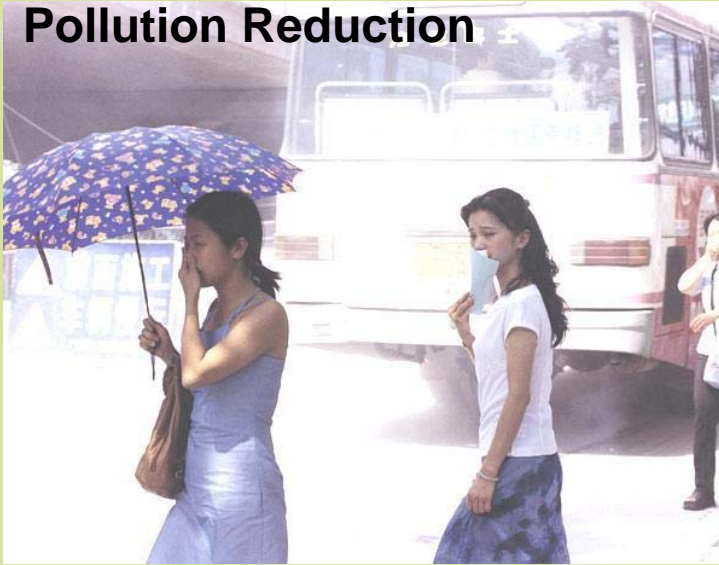
annual average suspended particulate matter (SPM) concentration of 100 µg/m<sup>3</sup> in the EU). Furthermore, in 2000, Jakarta was still ranked as one of the most polluted cities in the world, with a mean annual average suspended particulate matter (SPM) concentration of 100 µg/m<sup>3</sup> in the EU). Furthermore, in 2000, Jakarta was still ranked as one of the most polluted cities in the world, with a mean annual average suspended particulate matter (SPM) concentration of 100 µg/m<sup>3</sup> in the EU).



Photo: ADB

# Set targets for:

## Pollution Reduction



## CO<sub>2</sub> Emissions



Fuel Savings

# Monitoring your fleet's progress - guidance

The screenshot shows a Microsoft Excel spreadsheet titled 'inventoryoptions'. The main heading is 'Monitoring: Developing indicators for fleet strategy'. The data is as follows:

Ton-kms delivered:	35,200,000	ton-km
Total kms driven:	44,431,531	km

Indicators for climate change:	
Based on your fuel use and CO2 emissions your indicator number is:	
CO2 emission per km:	0.38 kg/km
Fuel use per km:	0.16 l/km
CO2 emission per ton-km:	0.4850 kg/ton-km
Fuel use per ton-km:	0.2064 l/ton-km

Indicators for air pollution:	
Fill in the numbers of vehicles in your fleet that fulfill each category of vehicles emission standards	
Euro I	Euro 4
45	4
Average Euro 4	

Read more on monitoring in Tool 17

## TNT Turkey ACCOMPLISHMENTS

- Average monthly vehicle emissions decreased 15% - from 0.73 to 0.63 tonnes CO2. While the total numbers of vehicles increased 19%, total CO2 emission decreased by 6% (2007-2008 emissions dropped by 9%)
- Similar reductions in air pollutants emissions
- Total fuel cost saving to date is Euro 100K (15 months since project start)
- Since project start 122 vehicles are replaced. The ratio of replacement is 41% to total number of vehicles today
- Within the scope of this project, 80 drivers are trained on eco and safe driving

# Toolkit contents at your disposal:

## Pollutants

Particulate Matter (PM)  
Nitrogen oxides (NOx)  
Carbon monoxide (CO)  
Volatile Organic Compounds (VOCs)  
Sulfur Dioxide (SO<sub>2</sub>)  
Carbon Dioxide (CO<sub>2</sub>)  
Ground Ozone (O<sub>3</sub>)  
Lead (Pb)

## Effects

Health effects  
Greenhouse Gases and Effects

## Fleet Examples

DHL  
FedEx  
Jakarta  
UPS

## Options

### New Vehicles

- Euro V Diesel trucks
- Changing from petrol to diesel passenger cars
- Changing from 2 stroke to 4 stroke motorcycles
- Hybrid Electric Vehicles (HEV) with emission controls
- Compressed Natural Gas (CNG) Vehicles with emission controls
- Fuel Cell with renewable hydrogen

### Drivers & Maintenance

- Optimal tyre pressure+ alignment
- Improved maintenance
- Eco-driving

### Fuels

- Use unleaded petrol
- Use ultra low sulphur diesel (ULSD)
- Natural gas and biogas
- Biofuels (Biodiesel & Bioethanol)

### In-use Vehicles: Retrofitting

- Diesel Oxidation Catalyst
- Diesel Particulate Filter
- Advanced emission control technologies

# Toolkit is a start...

## You determine the strategy & results!

- Cannot develop strategy for you
- Options & Inventory Tools are *indicative*
- *You* must secure support within your organization
- Develop realistic, cost-effective strategy
- Develop the **business case** (costs, savings)
- Implement & monitor your strategy



***[www.unep.org/pcfiv](http://www.unep.org/pcfiv)***

- ✓ **Post your experience**
- ✓ **Support, FAQ's, Updates, Experiences and more information**
- ✓ **email: [pcfiv@unep.org](mailto:pcfiv@unep.org)**

# Joining the Partnership for Clean Fuels and Vehicles...

- Joining a **global initiative & access support for your strategy**
- Support for promotion of lead-free, low-sulphur fuels, vehicle technologies & cleaner fleets
- Networking** with governments, industry, international organizations and civil society representatives addressing cleaner fuels and vehicles
- Global events and activities, including the annual Global Partnership Meetings
- Participation in global **Working Groups** addressing cleaner fuels and vehicles

# Thank you!



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