

Clean Up Your Fleet

Introducing a practical approach to cleaner, more efficient fleet operation



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
- ✓ 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/pcf
- ✓ **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

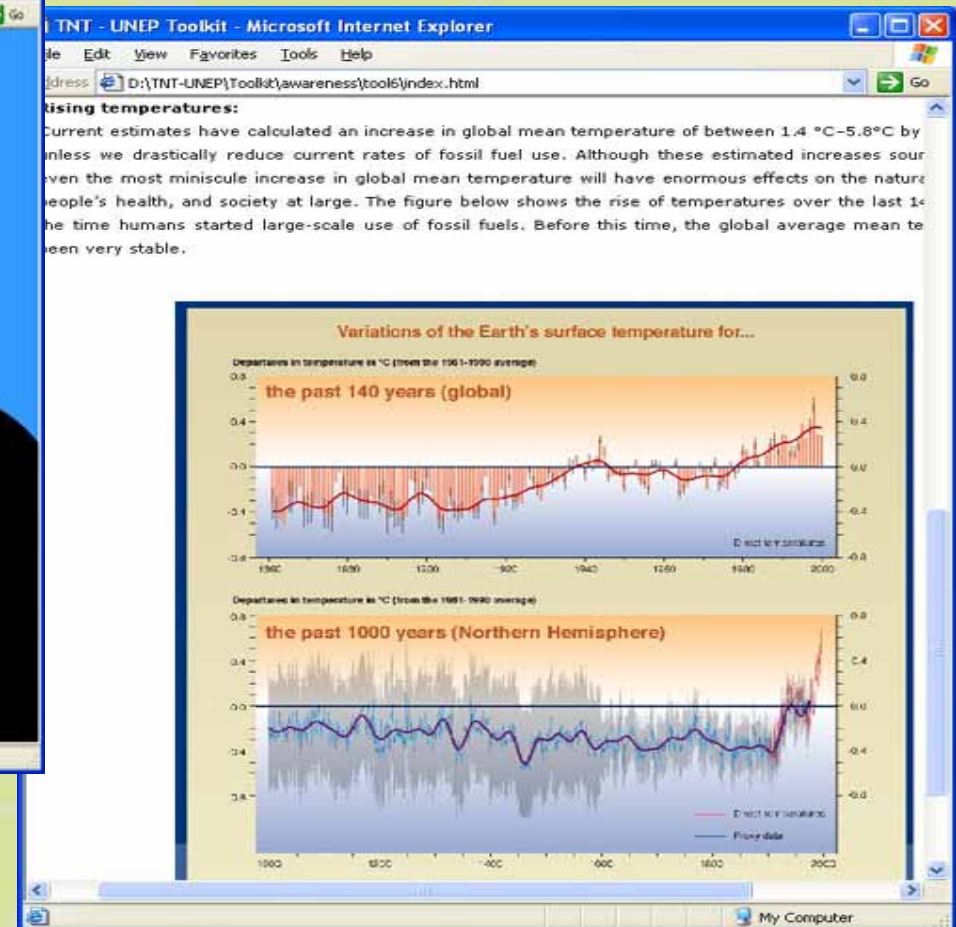
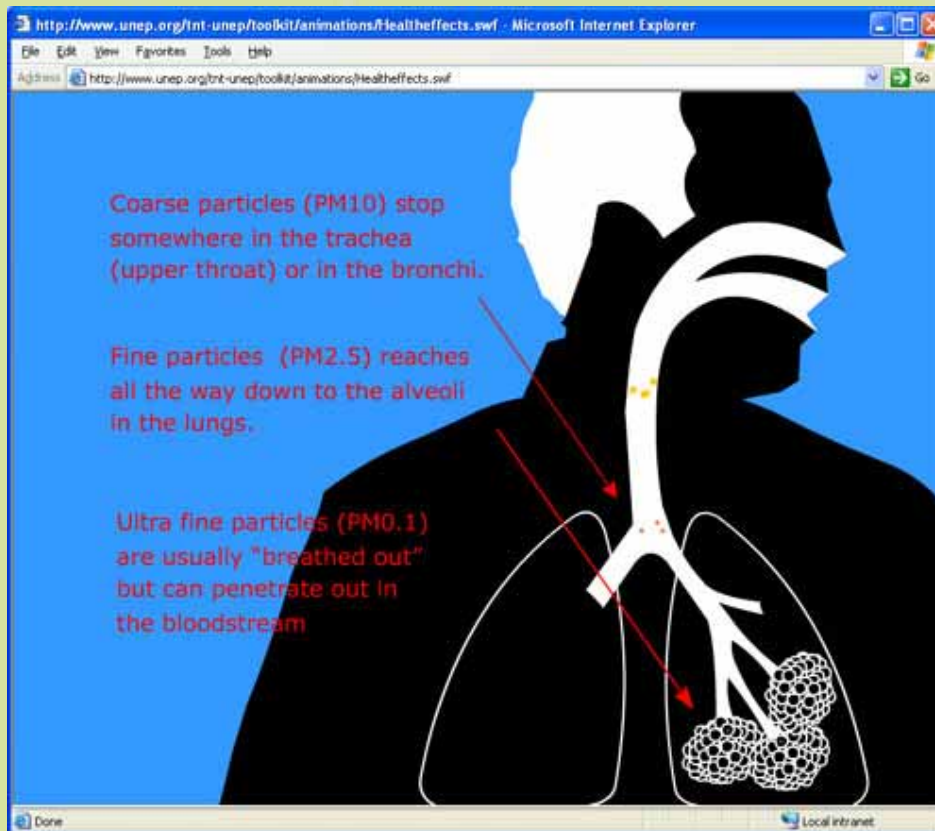


Step by step for cleaner fleets



Reference info on pollutants and impacts

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



Practical fleet inventory and impacts

Microsoft Excel - inventoryoptions

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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
Total	244	44,431,531	7,264,730

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

Your Fleet Emissions May Consist of:

CO₂: 17072 ton

NO_x: 179 ton

PM₁₀: 9 ton

	Air Pollution (in tonnes)		Climate Change (in tonnes)					
	Numbers	km/year	CO	VOC	NOx	SOx	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
Total	244	44,431,531	529	78	179	13	9	17,072

But what are the real-world effects of 9 tons PM₁₀? The Toolkit explains impacts in terms of human health and environment.

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).

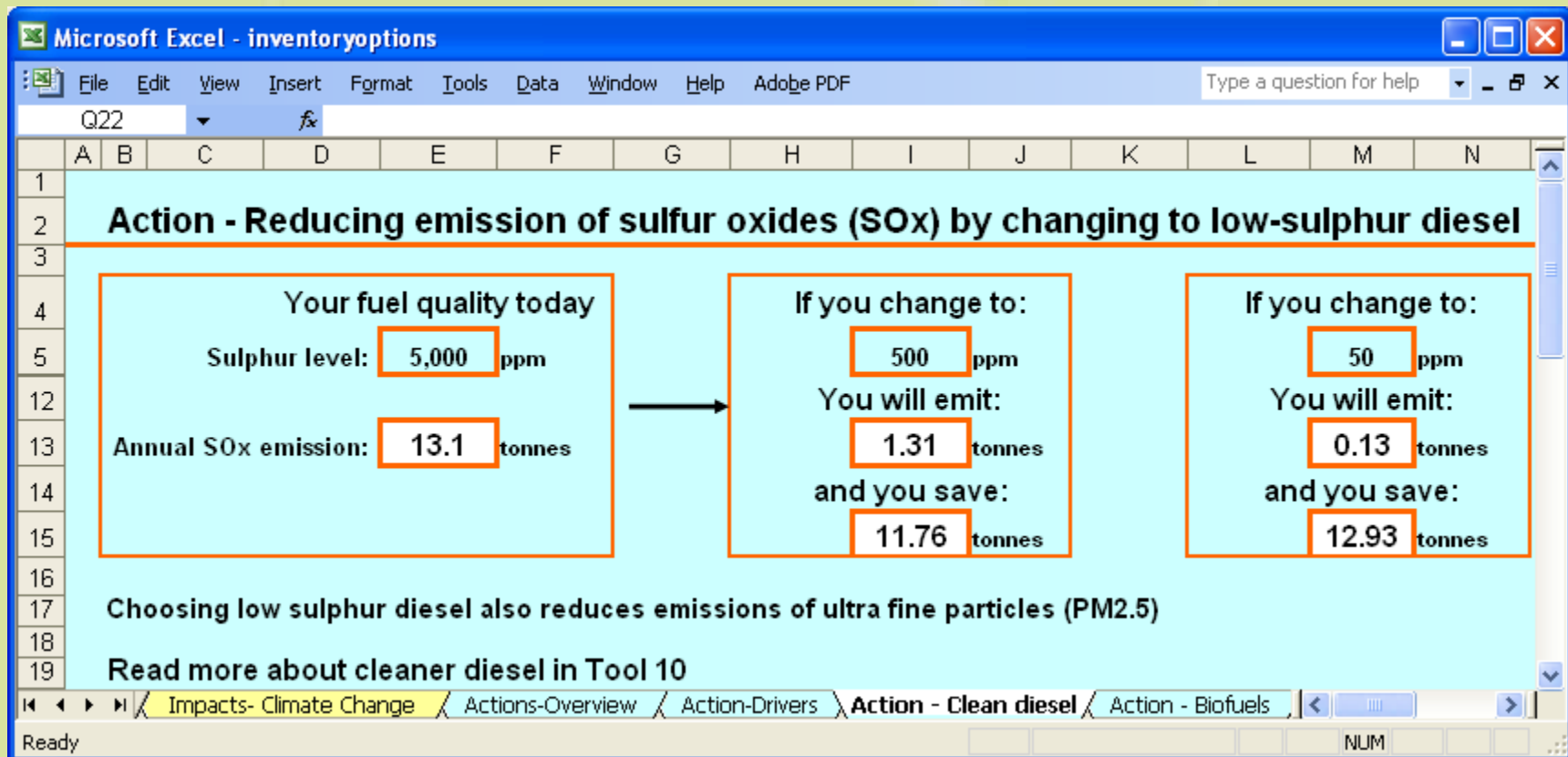
The effects of your vehicle emissions are strongly dependent on where the emissions occurs.

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.

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.



... 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

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Address <D:\TNT-UNEP\Toolkit\awareness\tool4\index.html>

annual average suspended particulate matter (SPM) concentration of 100 µg/m³ in the EU). Furthermore, in 2000, Jakarta was still ranked as one of the most polluted cities in the world, with an annual average suspended particulate matter (SPM) concentration of 100 µg/m³ in the EU). Furthermore, in 2000, Jakarta was still ranked as one of the most polluted cities in the world, with an annual average suspended particulate matter (SPM) concentration of 100 µg/m³ in the EU).




Photo: ADB


Table: Health Effects of Air Pollution	
Health Effect	People Affected
Premature Mortality	100 000
Respiratory Symptoms	100 000 000
Lower Respiratory Infections	100 000 000
Asthma Attacks	100 000 000
Chronic Bronchitis	100 000 000
Hypertension	100 000 000
Non-fatal Heart Attacks	100 000 000
IQ Decrement	100 000 000
Respiratory Hospital Admissions	100 000 000
Emergency Room Admissions	100 000 000
Restricted Activity Days	5 900 000

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

TNT - UNEP Toolkit - Microsoft Internet Explorer

United Nations Environment Programme

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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 CO₂ 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.

Set targets for:

Pollution Reduction



CO₂ Emissions



Fuel Savings

Monitoring your fleet's progress - guidance

Monitoring: Developing indicators for fleet strategy

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

These indicators are based on actual emissions as CO2 emissions and fuel use are easy to calculate.

Indicators for air pollution:
 Fill in the numbers of vehicles in your fleet that fulfill each category of vehicles emission standards

Euro I	Euro II
45	45

Average Euro sta

This is a technical in numbers of trucks ec

Read more on monitoring in Tool 17

Your can determin by the vehicle age vehicle was registe

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 (SO₂)
Carbon Dioxide (CO₂)
Ground Ozone (O₃)
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



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