



## BACKGROUND NOTE

# SOUTH AMERICA SULPHUR in VEHICLE FUELS CONFERENCE

**Organized by**

**The United Nations Environment Programme (UNEP)  
The Partnership for Clean Fuels and Vehicles (PCFV)  
Corporación para el Mejoramiento del Aire de Quito (CORPAIRE)**

13-14 February 2007  
Swissôtel, Quito

With support from the European Union and the United States Environmental Protection Agency



## **I. BACKGROUND AND OBJECTIVES OF THE CONFERENCE**

### **A. Background**

Countries in South America are now in the process of implementing numerous air quality management measures, including improved air quality monitoring in urban areas, vehicle emission standards building on European and US standards, and stricter fuel quality standards. The South American subregion has phased out the use of leaded gasoline, and countries such as Chile, Bolivia, and Brazil are leading the way in lowering sulphur levels in petrol and diesel fuels.

Alternative fuels and vehicles are also gaining ground with government support in Brazil and innovative public transport projects in Colombia are good examples of successful efforts to improve urban air quality. Chile and Ecuador also have ongoing heavy-duty diesel vehicle retrofit projects, combining emissions control technology with low sulphur fuels in existing vehicles. Vehicle emission standards are being reviewed and tightened in Peru, Argentina, Chile, and Brazil where current and planned standards are equivalent to Euro 2 through 4 standards for new light-duty gasoline and diesel vehicles (see Annexes III - V).

At the moment there is room for growth in the improvement of standards for cleaner fuels and vehicles in South America, and countries can benefit from the spectrum of experience and knowledge available from their neighbors. This is especially true with regard to sulphur levels in vehicle fuels. High sulphur concentrations in petrol and diesel fuel increase emissions of harmful pollutants from mobile sources, especially particulate matter. Combining high-sulphur fuels (in particular diesel) with older vehicle technology leads to unsafe levels of smoke, soot, and very fine particulate matter emissions that are extremely harmful to human health. Addressing sulphur in fuels and vehicle technology can yield significant results for improved air quality and human healthcare costs avoided, in addition to other environmental benefits. An overview of refining capacity by process is given in Annex I.

Sulphur levels of 500 ppm and below allow for the use of certain emission control technologies, currently in use in Europe, Asia, and North America. For example, fuels with 500 ppm or less sulphur enable the introduction of newer diesel vehicles that are equipped with diesel oxidation catalysts. This quality of diesel fuel also allows certain older heavy duty diesel vehicles to be retrofitted with emission control technologies; such projects are ongoing in Ecuador and Chile, and have been successful in Mexico City. At sulphur levels of 50 ppm or below emission reductions are even greater as diesel particulate filters and other technologies can be used in new and existing vehicles.

Sulphur levels in diesel fuels in South America vary from 5,000 parts-per-million (ppm) in Venezuela to 50 ppm now available in Chile metropolitan areas. In comparison, the US and Europe are now introducing 10-15 ppm sulphur in diesel. Countries like Brazil, Peru and Argentina have introduced or plan to introduce 50 ppm diesel either in cities or nationwide in 2009. Other countries like Uruguay, Paraguay, and Venezuela have yet to significantly lower sulphur levels in fuels.

The UNEP-based Partnership for Clean Fuels and Vehicles (PCFV), in cooperation with the Corporación para el Mejoramiento del Aire de Quito (CORPAIRE), have organized the sub-regional South America Sulphur in Vehicle Fuels Conference to discuss the status of cleaner fuels and vehicles in South America, progress made to date, and to identify strategies and actions that

will help move countries toward low-sulphur fuels and tighter vehicle emissions standards for improved air quality and health.

Prior to the conference, a sub-regional information gathering exercise on the status of air quality legislation, fuels and vehicles (including alternative) and progress/plans for the future was carried out and this updated information will be available for discussion at the conference.

The PCFV is the leading global initiative promoting better urban air quality through the use of cleaner fuels and vehicles. Established at the World Summit for Sustainable Development in 2002, it now has over 90 member organisations including governments, international organisations, industry groups, and non-governmental organisations involved in efforts to eliminate leaded gasoline worldwide and promote low sulphur in fuels concurrently with the introduction of cleaner vehicles and vehicle technology. The PCFV has actively worked in Latin America since 2004, supporting numerous projects in both Central and South America.

At their 4th annual Global Partnership Meeting in 2005, PCFV partners agreed on a long-term global target on sulphur for PCFV activities, taking into account the systems approach for cleaner fuels and vehicles and the necessity of closing the gap between developed and developing countries where fuels and vehicles are concerned. Partners agreed that the PCFV would work "To reduce sulphur in vehicle fuels to 50 ppm or below worldwide, concurrent with clean vehicles and clean vehicle technologies, with roadmaps and timelines developed regionally and nationally." Recently, the Sulphur Working Group of the PCFV finalized its report - *Opening the Door to Cleaner Vehicles in Developing and Transition Countries: The Role of Lower Sulphur Fuels* contact the UNEP Clearing-House (see details below). More information is available at [www.unep.org/pcfV](http://www.unep.org/pcfV); to obtain a copy of the report contact the UNEP Clearing-House (see details below).

CORPAIRE, as a partner organization of the PCFV, is the institution mandated by the Quito local government to oversee air quality management programmes in Quito. Its mission is to produce reliable data on the concentration of atmospheric pollutants in the Metropolitan District of Quito, which serves as inputs into the planning, formulation, implementation, and evaluation of policies oriented to the improvement of air quality in the city.

## B. Objectives of the Conference

The Latin America and Caribbean region is the most urbanized region in the developing world, and in countries like Argentina and Uruguay the urban population represents over 90 percent of the whole. Addressing urban air quality, mobile source emissions, and transport are key to improving the quality of life and opportunities available to urban residents in these countries.

The goal of this conference is to develop a clear vision of the way forward for cleaner fuels and vehicles in South American countries, along with the steps to be taken at the subregional and national levels, with the overall objective to improve urban air quality in South American cities. Specific goals and expected outcomes include:

(1) A better understanding of the current state of South American fuels and vehicles, and the challenges and opportunities available for cleaner fuels and vehicles;

(2) A clearer understanding of 'who's who' and ongoing initiatives in South America on this topic;

(3) Improved sharing of information and knowledge through the establishment of expert networks and communication structures on fuel and vehicle issues for improved air quality;

(4) Development of a realistic, step-by-step plan and timeframe for a reduction of sulphur levels in vehicle fuels to the lowest feasible level in each country, concurrent with clean vehicles and clean vehicle technologies, preferably aiming for ultra-low sulphur levels;

(5) An outline of concrete recommendations and next steps for cleaner fuels and vehicles in South America.

## **II. Topics to be discussed**

The agenda is organized over two days, with day 1 dedicated to introducing the background situation in South America, the systems approach to fuels and vehicles, and the industry perspective. Day 2 will include the more specific case studies of countries now considering or undergoing sulphur reductions, along with a low emission demonstration from International Truck and Engine Corporation. The last part of day 2 allows over 4 hours for discussion and agreement on next steps.

## **III. Organization of the Workshop**

The conference will be held on 13-14 February 2007 at Swissôtel, Quito. It will be conducted in Spanish and English and simultaneous interpretation services in both languages will be provided.

On the second day of the conference, participants will be asked to work together in working groups that will discuss the national and regional actions that may be taken to promote cleaner fuels (especially low sulphur fuels) and vehicles in South America.

## **IV. Correspondence and Inquiries**

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## Annex I: Crude Oil Refining Capacity, by Process

Energy Information Administration

*International Energy Annual 2004*

Table Posted: June 19, 2006

Next Update: June 2007

<http://www.eia.doe.gov/emeu/international/oilother.html>

### 3.6 World Crude Oil Refining Capacity, January 1, 2005

Country	Number of Refineries	Thousand Barrels per Calendar Day			
		Crude Oil Distillation	Catalytic Cracking	Thermal Cracking	Reforming
Argentina	10	625	149	38	60
Bolivia	2	47	0	0	15
Brazil	13	1,920	500	10	24
Chile	3	227	51	14	26
Colombia	5	286	90	52	0
Ecuador	3	176	18	32	13
French Guiana	0	0	0	0	0
Guyana	0	0	0	0	0
Paraguay	1	8	0	0	0
Peru	6	193	32	0	2
Suriname	1	7	0	3	0
Uruguay	1	50	12	7	12
Venezuela	5	1,282	232	0	50

#### Notes and Sources for Table 3.6

Data in thousand barrels per day are on a calendar day basis.

Additional information and country analysis from the EIA can be found at <http://www.eia.doe.gov/emeu/cabs/contents.html>

## ANNEX II: Latin America and the Caribbean, Sulphur Levels in Diesel Fuel, As of 1 February 2007\*

COMMENTS	Sulphur Level (ppm)	COMMENTS	SOURCE
Anguilla			
Antigua and Barbuda			
Argentina	1200	Industry standard. 2009 target of 50 ppm to coincide with Euro IV standards for diesel passenger vehicles. Gasoline sulphur limit is 3500 ppm.	AFEEVAS Brazil
Aruba			
Bahamas			
Barbados			
Belize			
Bermuda			
Bolivia	500		ARPEL 2005
Brazil	500/2000	500 ppm in metropolitan areas and 2000 nationally. Jan 2009 target of 50 ppm nationally to coincide with Euro IV standards for diesel passenger vehicles. Gasoline sulphur limit at 1,000 ppm.	Ford Brazil
Cayman Islands (BVI)			
Chile	50/350	50 ppm for metro areas and 350 nationally; 2010 plans for 10 ppm metropolitan, 50 ppm national.	CONAMA Chile
Colombia	1200/4500	1200 ppm in Bogotá, 4500 ppm everywhere else; legislation under development for 500 ppm S level in diesel by 2008 or 2010.	National University of Colombia
Costa Rica	4500	Plans are underway for a reduction to 4,000 ppm in 2005/2006, 3500 ppm in 2007 down to 500 ppm in 2008.	ARPEL 2005; Kukulcan Foundation Workshop Report, Guatemala 2004
Cuba			
Dominica			
Dominican Republic			
Ecuador	500/3000	Premium/Regular; Gasoline sulphur limit at 2,000 ppm.	Ecogestion Ecuador
El Salvador	5000		Kukulcan Foundation Workshop Report, Guatemala 2004; ARPEL 2005 agrees
French Guiana			
Grenada			
Guatemala	5000		Kukulcan Foundation Workshop Report, Guatemala 2004; ARPEL 2005 agrees

Guyana			
Haiti			
Honduras	5000		Kukulkan Foundation Workshop Report, Guatemala 2004; ARPEL 2005 agrees
Jamaica	5000		Jamaica aims to require 2% biodiesel additive.
Mexico	300/500	Metropolitan/Non-Metro areas; NOM-086 requires reduction to 15 ppm beginning in 2007 in the north US border, available in cities early 2009, rest of the country from mid 2009.	SEMARNAT, PEMEX
Montserrat			
Nicaragua	5000		ARPEL 2005; Kukulkan Foundation Workshop Report, Guatemala 2004 states 6000
Panama	5000		Kukulkan Foundation Workshop Report, Guatemala 2004; ARPEL 2005 agrees
Paraguay	5000		IFQC 2004; ARPEL 2005 agrees
Peru	3000/5000	For diesel 1 and diesel 2 grades, respectively. Government decree of July 2005 provides for reduction to 50 ppm as of 2010.	USEPA Daily Environment Report 'Peru Cracks Down on 'Dirty' Diesel Fuel, Sets Deadline for Cutting Sulfur Content'; IFQC 2004 states 5000/1500; ARPEL 2005 states 5000/7000
Puerto Rico			
St Kitts and Nevis			
Saint Lucia			
St Vincent and the Grenadines			
Suriname	5000		ARPEL 2005
Trinidad and Tobago	1500		ARPEL 2005
Turks and Caicos Islands			
Uruguay	2500	Gasoline sulphur level at 3500 ppm.	AFEEVAS Brazil
Venezuela	5000		IFQC 2004; ARPEL 2005 agrees
Virgin Islands			
<b>Total: 42 countries</b>			

\*Please contact [elisa.dumitrescu@unep.org](mailto:elisa.dumitrescu@unep.org) with any changes or corrections. The most recent and updated information on this subject is available at <http://www.unep.org/pcf>

#### References:

ARPEL July 26, 2005 Personal Correspondence

IFQC 2004 <http://www.worldfuelsconferences.com/images/ee04/Pye.pdf>

Kukulcan Foundation held a workshop on Central American Clean Fuels and Vehicles in Guatemala City, April 2004

Michael Walsh, International Consultant, Global Clean Fuels Overview, June 26, 2005

SEMARNAT, PEMEX Announcement of Low Sulphur Diesel, December 2005  
[http://portal.semarnat.gob.mx/comunicacionsocial/boletines\\_2005\\_275.shtml](http://portal.semarnat.gob.mx/comunicacionsocial/boletines_2005_275.shtml)

South America Vehicles Emission Control Equipment Manufacturers Association (AFEEVAS)

**ANNEX III: LATIN AMERICA AND THE CARIBBEAN  
PASSENGER VEHICLE STANDARDS & FLEETS, As of 1 February  
2007**

<b>COUNTRY</b>	<b>IMPORT *</b>	<b>FLEET</b> (motor vehicles/1000 people)	<b>STANDARDS &amp; I/M</b>	<b>COMMENT</b>
Anguilla			Inspection required before registration.	Most cars imported from the US.
Antigua and Barbuda	No import restriction	195 (1994 est.)	There is an environmental tax for vehicles.	
Argentina	Only new vehicles, equipped with emission control technologies according to Euro 3 standard.	181 (2003)	As of 2006, new light-duty vehicles must comply with Euro 3, Euro 4 as of 2009, likewise for new diesel trucks and buses. I/M programs are implemented in 7 major cities in the country, with emission inspections to begin January 2008.	Some vehicles imported from Brazil; about 56% of passenger vehicles in Buenos Aires are diesel, 35% are petrol, and the rest are CNG. A city bus retrofit project is to be launched in Buenos Aires and Cordoba.
Aruba	No import restriction			
Bahamas	No import restriction			
Barbados	Used vehicles must be less than four years old, and an environmental tax is paid on arrival.	370 (2003)		Introduction of electric and hybrid cars. Ethanol additive as 10% of gasoline planned, according to UNFCCC.
Belize	No import restriction, although an environmental tax is paid on arrival.	91 (1998)	Indication of vehicle inspection system.	Between 5-8% of vehicles run on butane.
Bermuda	No vehicle over six months old can be imported.		Annual inspection required for all cars; extremely strict laws regarding transport.	The density per square mile of motor traffic on the roads is the highest in the world - more than 2,600 vehicles per square mile; mostly Japanese

				cars. Measures are proposed to limit the number of cars, ban all second-hand cars and restrict car ownership.
Bolivia	No import restriction.	10 (2003)	Indication of vehicle inspection system.	
Brazil	Importation of used vehicles is banned, as is import of diesel vehicles. Imported vehicles must meet Euro 4 standards.	170 (2003)	Vehicle emissions standards set by IBAMA, based on Euro standards: Euro 2 implemented in 1993, Euro 4 planned for 2008 equivalent to PROCONVE IV standard), and Euro IV in 2009. All new trucks and buses must be Euro 4 in 2009. A vehicle inspection program is due to start in 2009.	In 2005, 70% of the cars sold in Brazil were flex-fuel. There is an ongoing bus retrofit program in São Paulo.
Cayman Islands (BVI)	No import restriction, although an environmental tax is paid on arrival.		Roadworthiness inspection certificate required for registration, and yearly after that.	
Chile	Importation of used vehicles is banned.	136 (2003)	Emissions testing programme started in 1994 - annual and roadside inspections. Euro 3 standards introduced in 2004, Euro 4 to start in 2009 for passenger cars. Euro 4 for diesel light vehicles required from 2005.	In-use petrol vehicles have to meet I/M limits of 0.5% CO and 100 ppm HC; diesel light-duty cars must meet PM limit of 0.125 g/km; loading testing of diesel trucks undertaken. As of April 2007, over 1,000 municipal buses will be required to install diesel particulate filters.
Colombia	Importation of used vehicles is banned.	51 (2003)	I/M programme has yet to be made operational,	Started ethanol programme in 2002.

			according to USEPA. Catalytic converters required on all vehicles. Light-duty petrol vehicles must conform to emissions standards roughly equivalent to that of USEPA 1987 standards. New vehicles must comply with Euro 1; heavy-duty diesel vehicles must comply with equivalent of USEPA 1994 standards for buses and 1991 standards for other vehicles. New buses must comply with Euro 2, other new heavy duty vehicles with Euro 1.	
Costa Rica	Imported vehicles must pass EPA Smog Test signed off by local consulate; all imported vehicles must have catalytic converters.	185 (2003)	Test-only annual inspection system started in 2002 undertaken by one private company. Taxis tested twice per year.	
Cuba	Used vehicles must be less than four years old (by date of manufacture, not model year).	37 (1990)	Inspection system started in 2001.	High proportion of old American (pre-1959) and Russian cars; new imports from China.
Dominica	No import restrictions, but environmental levy must be paid on arrival (varies for new and vehicles over 5 years old).		Considering a vehicle emission testing programme.	
Dominican Republic	Limit of 2000cc and maximum of six cylinders; no 'luxury' cars	97 (est. 2001)	Indication of vehicle inspection system.	

	allowed.			
Ecuador	Importation of used vehicles is banned. Model 2000 and newer cars must have catalytic converters.	53 (2003)	New light-duty petrol vehicles must conform to emissions standards roughly equivalent to that of USEPA 1987 standards or Euro 1; new heavy-duty diesel vehicles must comply with equivalent of USEPA 1994 standards or Euro 2. Emission testing programme run by CORPAIRE, a mixed public/private institution.	Heavy duty diesel retrofits ongoing in Quito, 200 buses planned for 2007.
El Salvador	Import requires proof that vehicle complies with emission control requirements; vehicles must be manufactured after 1995.	61 (1997)	Fuel sulphur specs - diesel (5000 ppm), petrol (1500 ppm)	
French Guiana			New cars must be equipped with catalytic converters.	
Grenada			Inspection required before registration; environmental levy on vehicles depending on age.	
Guatemala	No import restriction	57 (2003)	I/M program cancelled according to USEPA.	
Guyana	No import restriction		As of 2004, Guyana EPA and Bureau of Standards were developing emissions standards.	UNFCCC documents suggest a 5 year age maximum for cars and 3 year maximum for heavy vehicles; Guyana starting ethanol production.
Haiti	No import	8 (1990)		

	restriction			
Honduras	Used vehicles must be less than seven years old.	61 (2003)	Indication of an inspection system.	Most new car sales are Japanese cars.
Jamaica	Used vehicles must be less than three years old (from date of manufacture).	175 (2004)	Inspection system in place; 2004 legislation will privatise system.	Incentives to import diesel cars (to increase fleet portion from 14% to 30%).
Mexico	The vehicle must be a minimum of 5 years old (and max of 10 years), must have a gasoline engine, and must be equipped with a catalytic converter.	201 (2003)	Since 1993, heavy-duty diesel vehicles must meet one of these standards: US 1998, US 2004, Euro 3, or Euro 4. All light-duty and passenger vehicles must meet US Tier 1, except on NOx (levels vary) and PM (applies only to diesel).	Average age of vehicle fleet 9 years.
Montserrat				Most cars are from Japan, most buses and trucks from the US or UK.
Nicaragua	Used vehicles must be less than ten years old and must pass emissions test before registration.	39 (2003)	Nicaragua considering phase-in of an I/M programme to start with new cars then phase in older ones, according to USAID.	
Panama	Imported vehicles must pass emissions test before registration.	107 (2003)		
Paraguay	Importation of used vehicles is banned.	88 (2003)		
Peru	Passenger vehicles must be less than five years old, commercial vehicles less than eight years old.	46 (2003)	I/M programmes in certain cities; throughout the country as of 2007.	Subsidies of \$1,000 USD provided to convert taxis to LPG.
Puerto Rico	No import restriction	295 (1990)	Annual inspection required for all	

			vehicles more than two years old, includes emissions test and follows US emission standards.	
St Kitts and Nevis	No import restriction, but environmental levy to be paid, depending on vehicle age.	297 (1999 est.)		
Saint Lucia		166 (1999 est.)	Roadworthiness inspection programme started in 2003.	
St Vincent and the Grenadines		128 (2001)		
Suriname	Used vehicles must be less than five years old.	143 (2000 est.)		
Trinidad and Tobago	No import restriction	220 (1998 est.)	Indication of vehicle inspection system	
Turks and Caicos Islands			Indication of vehicle inspection system	
Uruguay	Importation of used vehicles is banned, new vehicles must meet Euro 3 standard.	138 (1990)	Indication of vehicle inspection system	Average age of vehicle fleet 17 years.
Venezuela	Importation of used vehicles is banned.	90 (1990)	Emissions testing in certain areas, with fines for violators.	
Virgin Islands	No import restriction.			
<b>Total: 42 countries</b>				

\*Referring to vehicle age, emissions standards, and technology requirements.

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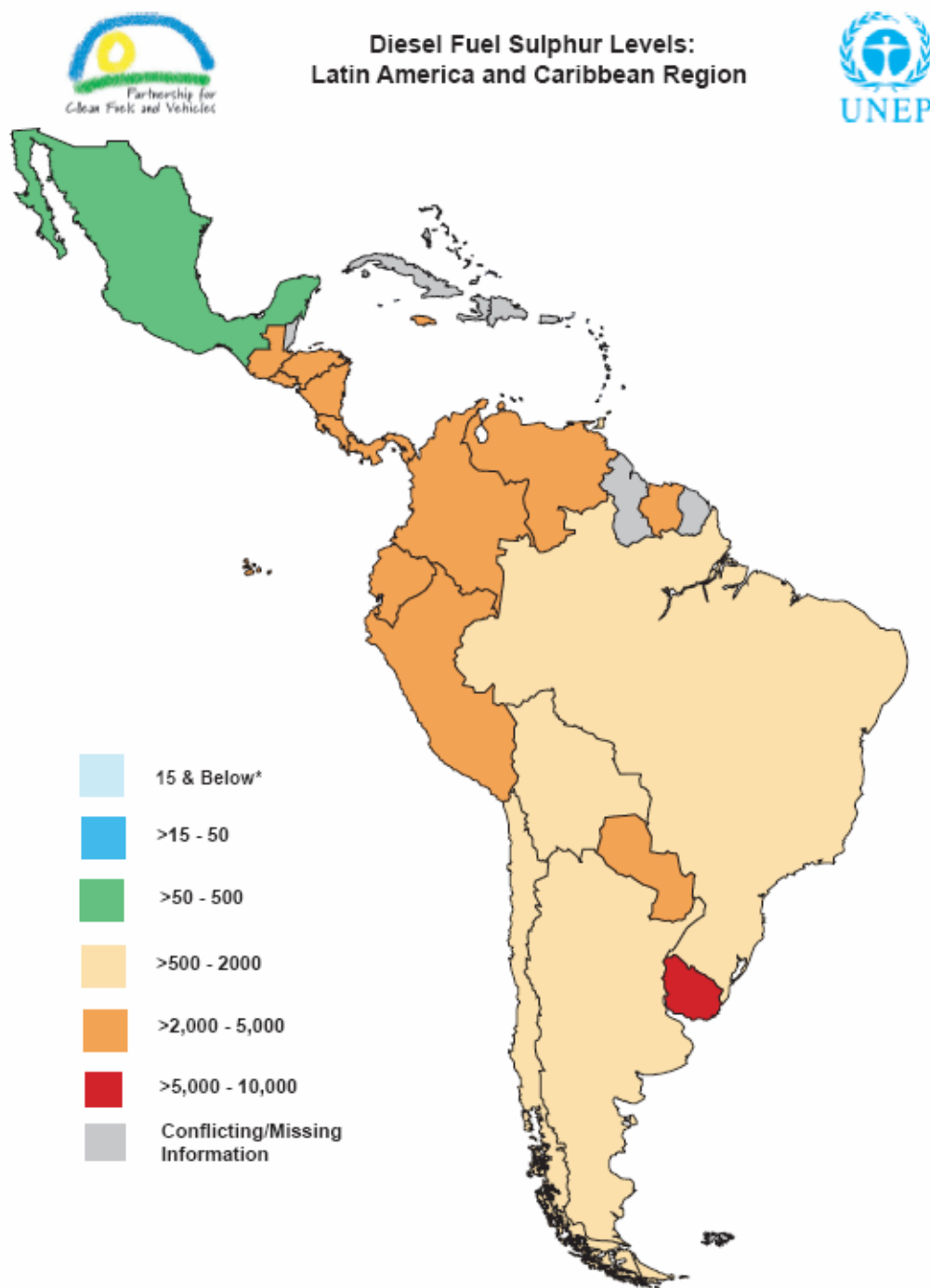
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South America Vehicles Emission Control Equipment Manufacturers Association (AFEEVAS)

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## ANNEX IV

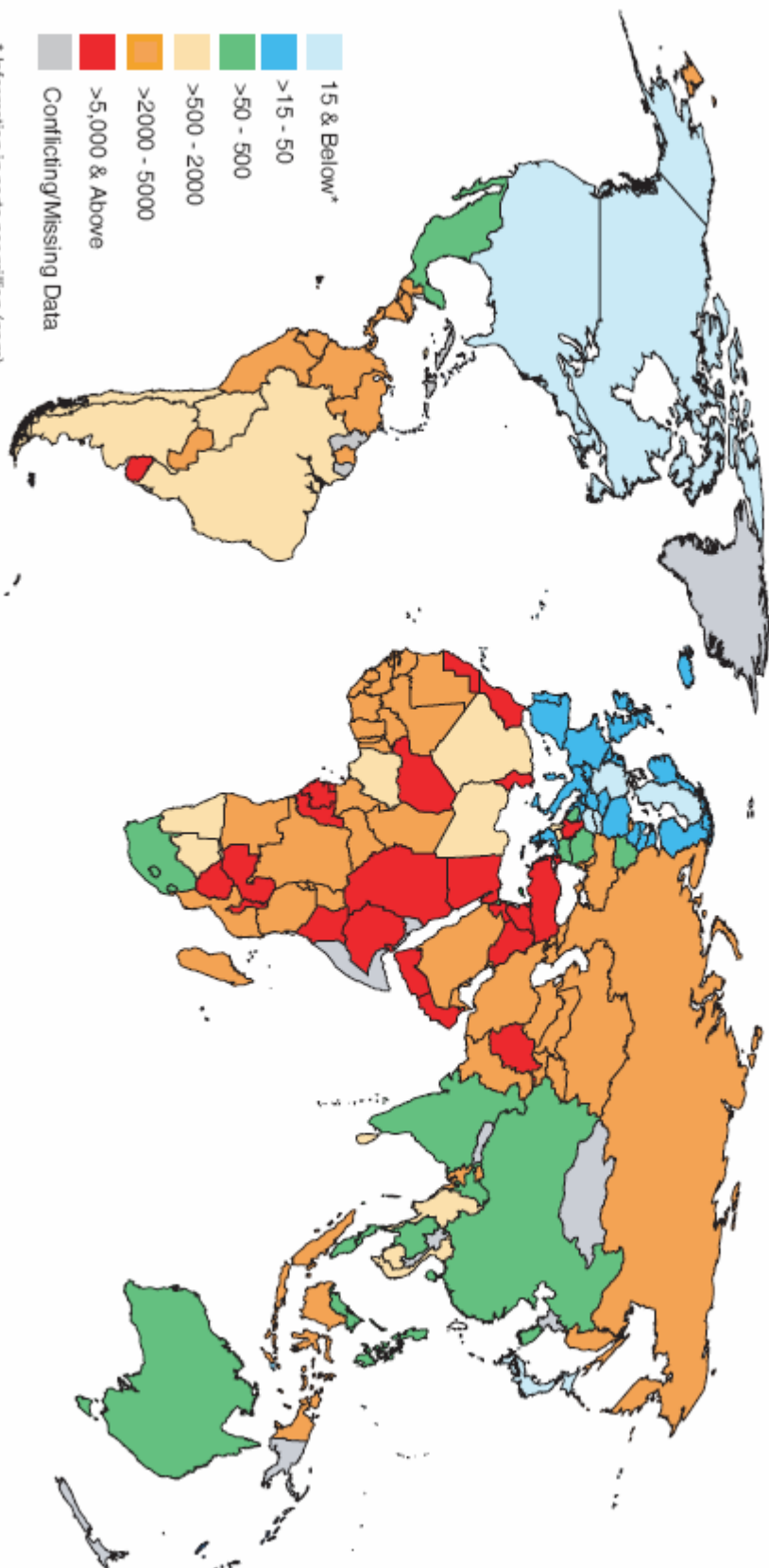


\* Information in parts per million (ppm), maximum allowable nationwide.  
Sulphur levels are maximum allowable as of February 2007. For additional details and comments per country, visit [www.unep.org/pcfsv](http://www.unep.org/pcfsv).

# ANNEX V



## Diesel Fuel Sulphur Levels: Global Status



\* Information in parts per million (ppm)  
Sulphur levels are a maximum allowable as of February 2007. For additional details and comments per country, visit [www.unep.org/pfv](http://www.unep.org/pfv).