China-Japan Alliance Against Air Pollution

- Auto Industry's View -

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Hiroyuki Watanabe

Senior Technical Executive
Toyota Motor Corporation

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1. Growing Auto Market in China

2. Environmental Policies in China and Japan

3. Concept of *Alliance Against Air Pollution* (Draft Proposal)

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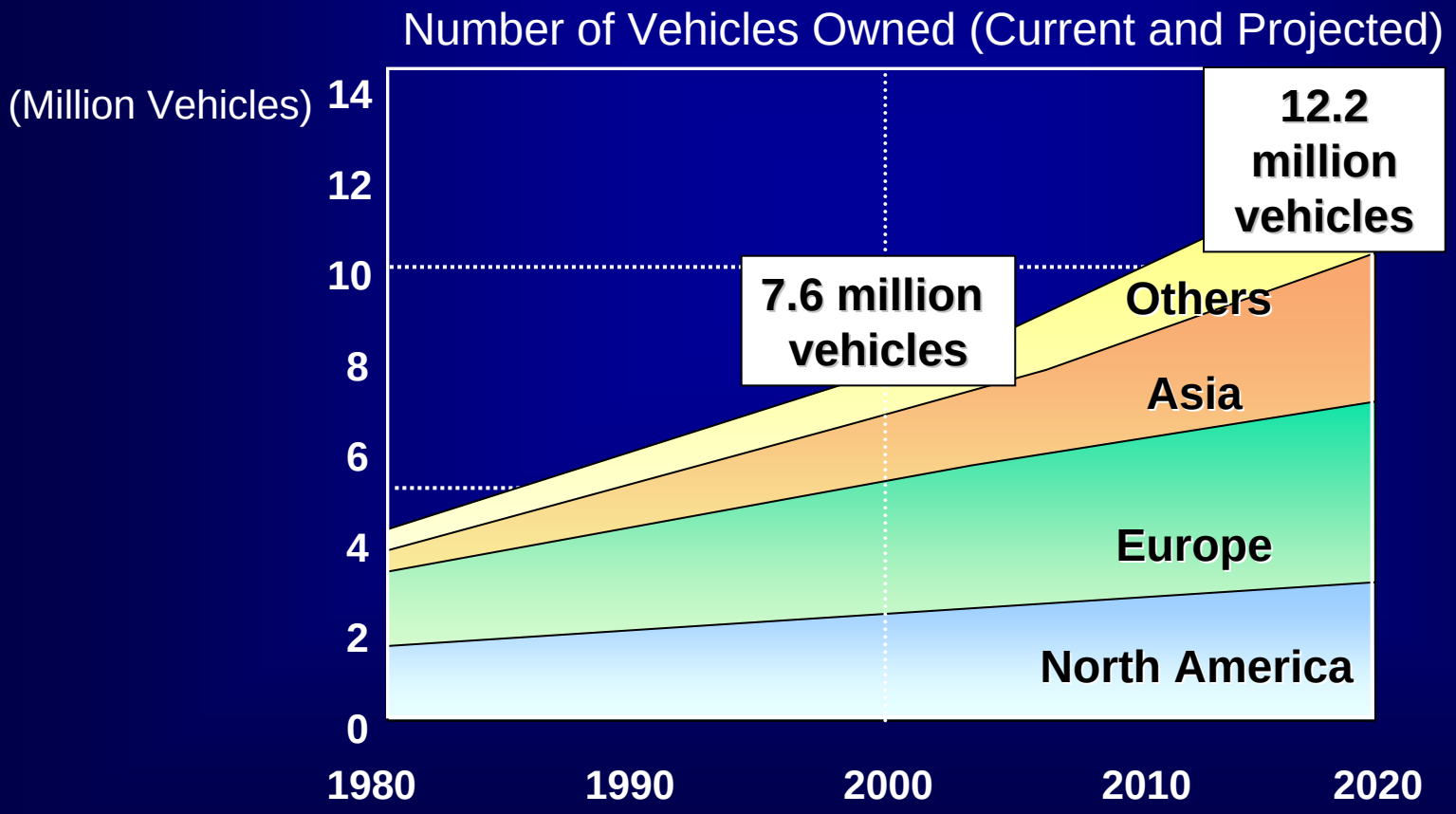
Growing Auto Market in China

- Last year, China became the second largest market in the world after the U.S.
- The automobile ownership in 2050 is projected to be 17 times in China.



Source: The Institute of Energy Economics, Japan (March 2004)

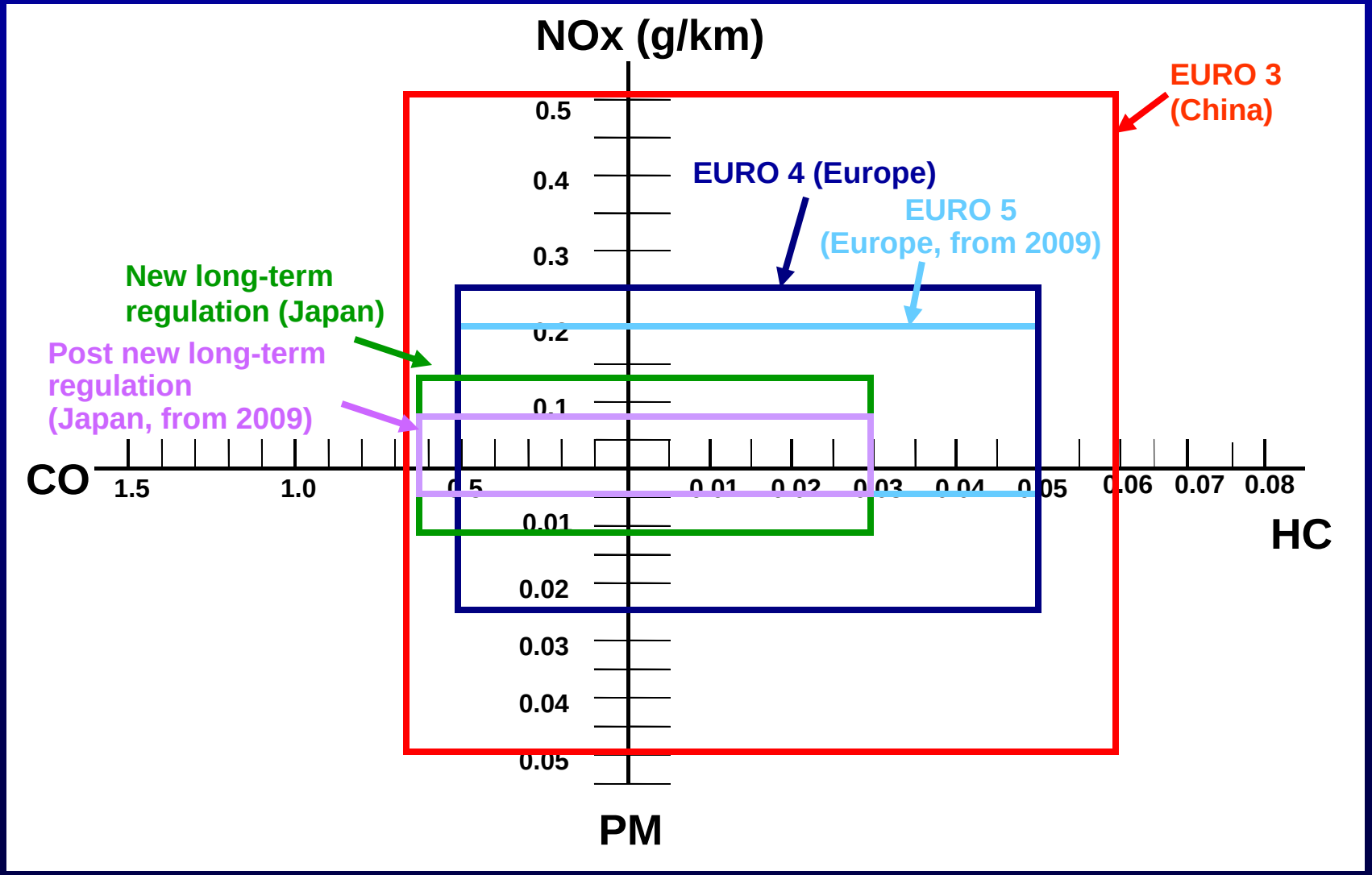
Emission Regulations in China

- Beginning from 2008, Beijing city will adopt regulations that are at the same level as those in Japan, the U.S., and Europe. (Euro4)
- Throughout China as a whole, regulations are equivalent to those seven years ago in Japan, the U.S., and Europe. (Euro3)

Changes in Emission Regulations in Different Countries

Country	2004	2005	2006	2007	2008	2009	2010	2011	2012
Europe	Euro3		Euro4				(Euro5)		
U.S.	Tier2 (Gradual) ------>								
Japan	New Short-term		New Long-term Std				Post New Long-term Std		
China	Euro2			Euro3			(Euro4)		
Beijing	Euro2		Euro3		(Euro4)				
Guangzhou	Euro2			Euro3		(Euro4)			

Emission Regulation for Diesel Passenger Vehicles



China Fuel Regulations

- **Emissions also depend on the quality of the fuel.**
- **High lead and sulfur content in gasoline, or high sulfur content in diesel fuel, impairs the emissions conversion performance of the catalyst.**

Fuel regulations

	Lead (g/L) (gasoline)	Sulfur (ppm) (diesel fuel)
Europe	0.005	50
U.S.	0	15
Japan	0	50 (10)
China	0.005	**350**
Beijing, Guangzhou	0.005	**50**

(Source: Dajiyuan FP/Getty Images)

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Current Environmental Policies in China

Dual focus on the economy and environment

China's Five-Year Plan **(2006 - 2010)**

Construct a balanced and resource-conserving economy and society.

- Energy conservation target:
20% reduction in energy consumption per GDP by 2010

- Pollutant reduction target (SO_2, COD):
10% reduction in total emissions by 2010

(Source: China Internet Information Center)

2007 Governmental Action Plan

GDP growth target: 8%

- Special efforts on improving resource conservation and environmental protection

- Primary activities include capital investment, technology deployment, policy development, etc.

History of Environmental Policies in Japan

Prioritize pollution prevention

Balance with economy thereafter

1967 **Basic Law for Environmental Pollution Control**

- **Protection of the people's wellness and their living environment**

← Four major pollution lawsuits
(Itai-Itai disease, Minamata disease, Niigata Minamata disease, Yokkaichi asthma)

1970 **Articles concerning economic balance were eliminated.**

Priority was pollution prevention.

Established technology with the highest level of environmental performance in the world.

Achieved a significant growth in industrial competitiveness.

1994 **Basic Environmental Plan**

- **Goal is to create an economic and social system based on a cycle with less negative impacts on the environment.**

2006 **The 3rd Basic Environmental Plan**

Positive cycle for the environment and economy

Becoming a Leading Environmental Nation Strategy in the 21st Century

21st Century Environment Nation Strategy (End of May, 2007)

(1) Prevent global warming. (2) Construct a recycling-based society. (3) Protect biodiversity.

This plan incorporates the following primary programs.

(1) Work to *develop innovative technology* and *create a low-carbon society* in order to reduce global GHG emissions by half by 2050.

(2) Take international steps to create a sustainable resource cycle.

(3) Protect biodiversity in order to benefit from and maintain nature. Create vigorous local communities which make the best use of the benefits of nature.

(Source: JIJI Press)

-Engage in international cooperation that makes use of successful experiences in pollution prevention.

-Apply Japan's advanced environmental technologies to Asia and the rest of the world.

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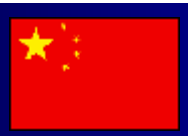
China-Japan Alliance Against Air Pollution (Draft Proposal)

(1) Establish long-term China-Japan targets which are focused exclusively on environmental problems.

(2) Develop an action plan to achieve these targets.

(3) Expand on subject areas which are based on the results of (1) and (2).



Basic concept (proposed)

The atmosphere shall be considered a shared resource and asset of China and Japan under the joint management.

Control pollutant emissions and monitor the atmosphere to improve the atmospheric environment.

E.g.) Background of the EU establishment → Sharing of basic principles

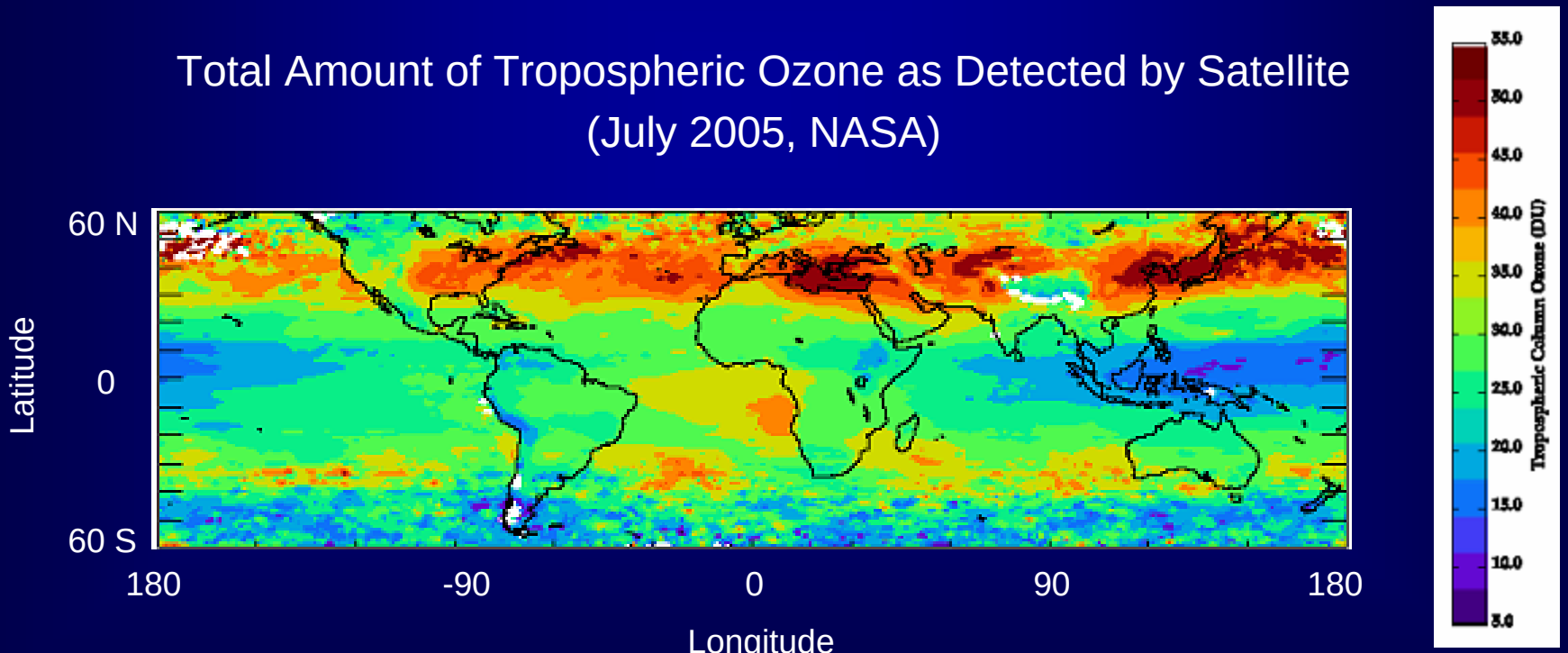
- A common infrastructure through the cooperative management of coal and steel resources
- Developed based on organizations such as the European Coal and Steel Community and the European Atomic Energy Community

Example: State of Tropospheric Ozone

- Ozone (O_3)* extends beyond Asia and is distributed across the northern hemisphere.

*O_3 is one type of photochemical oxidants (Ox) which causes photochemical smog.

Total Amount of Tropospheric Ozone as Detected by Satellite (July 2005, NASA)

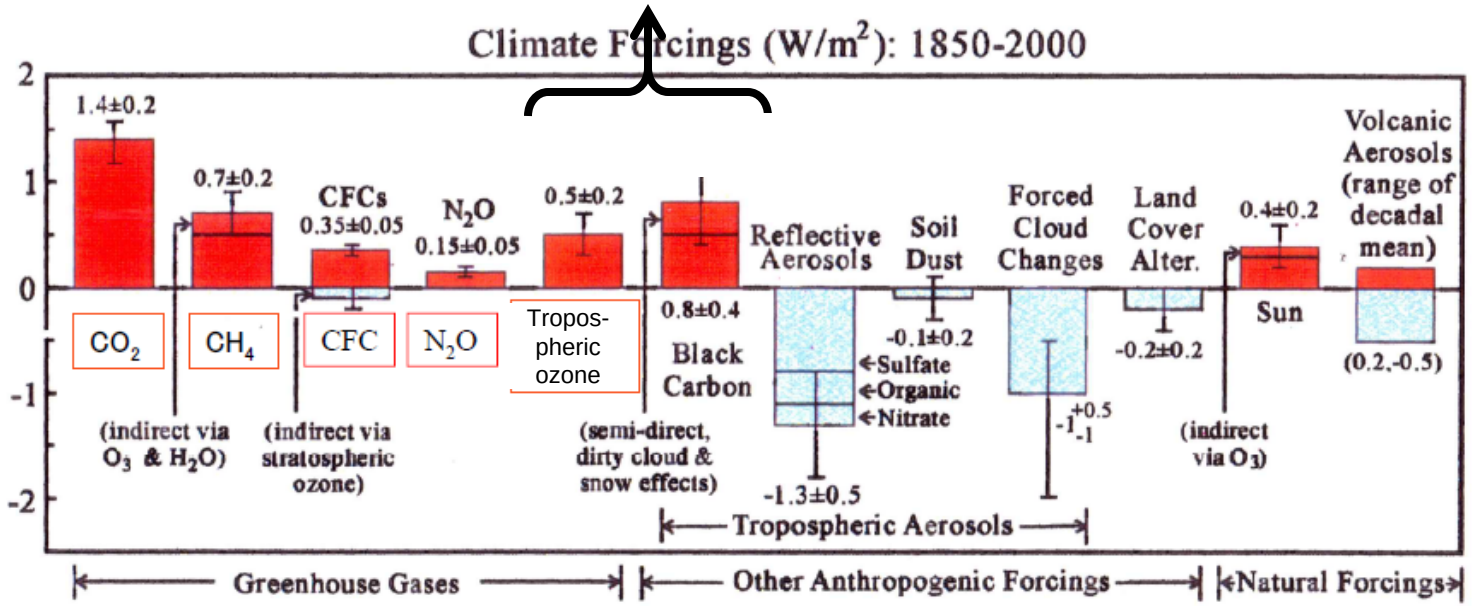


Example: Greenhouse Effect of Tropospheric Ozone and Black Carbon Particles

What substances have caused global warming so far, and to what extent?

- Radiative forcings from 1850 to 2000 -

Tropospheric ozone and black carbon particles also have greenhouse effect.



Long-lifetime GHG (Kyoto gases)

Short-lifetime atmospheric pollutants

Sato and Hansen (2003)

Need balanced monitoring!

Source: Frontier Research Center for Global Change, "Causes of Climate Change: More than just Carbon Dioxide- Ozone, Aerosols, and Global Warming," from presentation materials of general lecture by Mr. Akimoto of the Japan Agency for Marine-Earth Science and Technology (Aug. 4, 2004)

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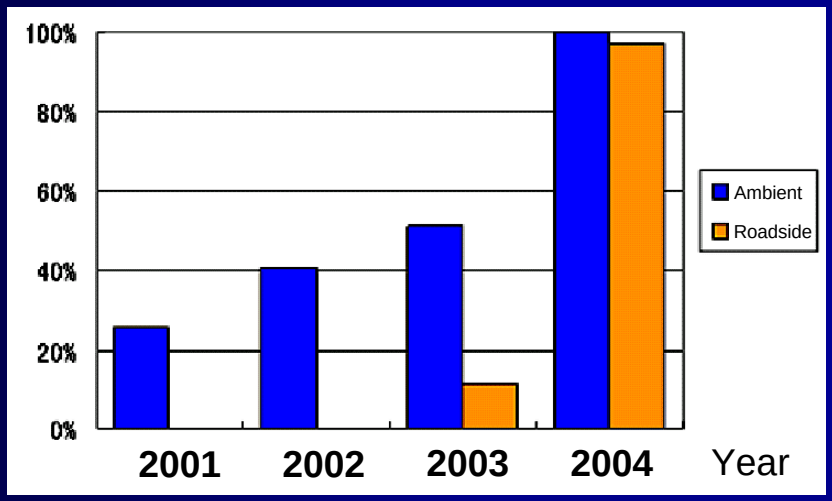
Measures Related to Automobiles

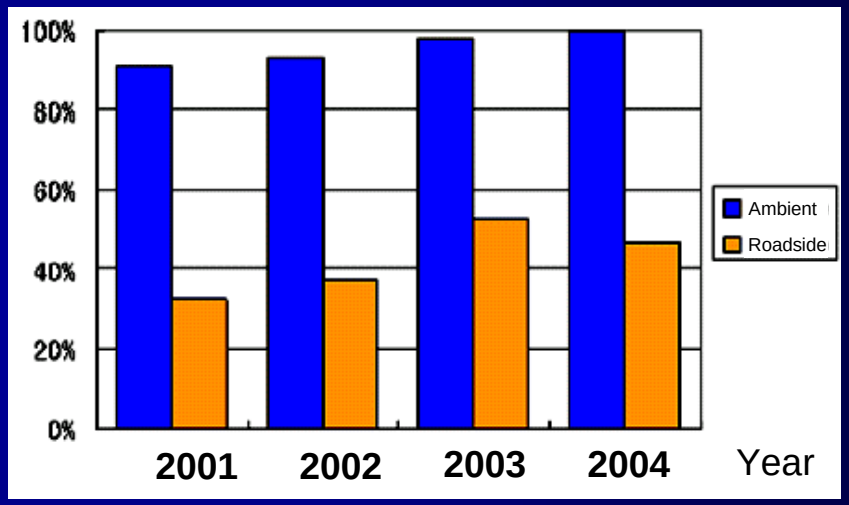
- **Atmospheric monitoring**
  (sharing monitoring technologies and data)

Example: Status of environmental standard achievement in Tokyo

SPM



NOx



Ambient: Ambient air pollution monitoring station

Roadside: Roadside air pollution monitoring station

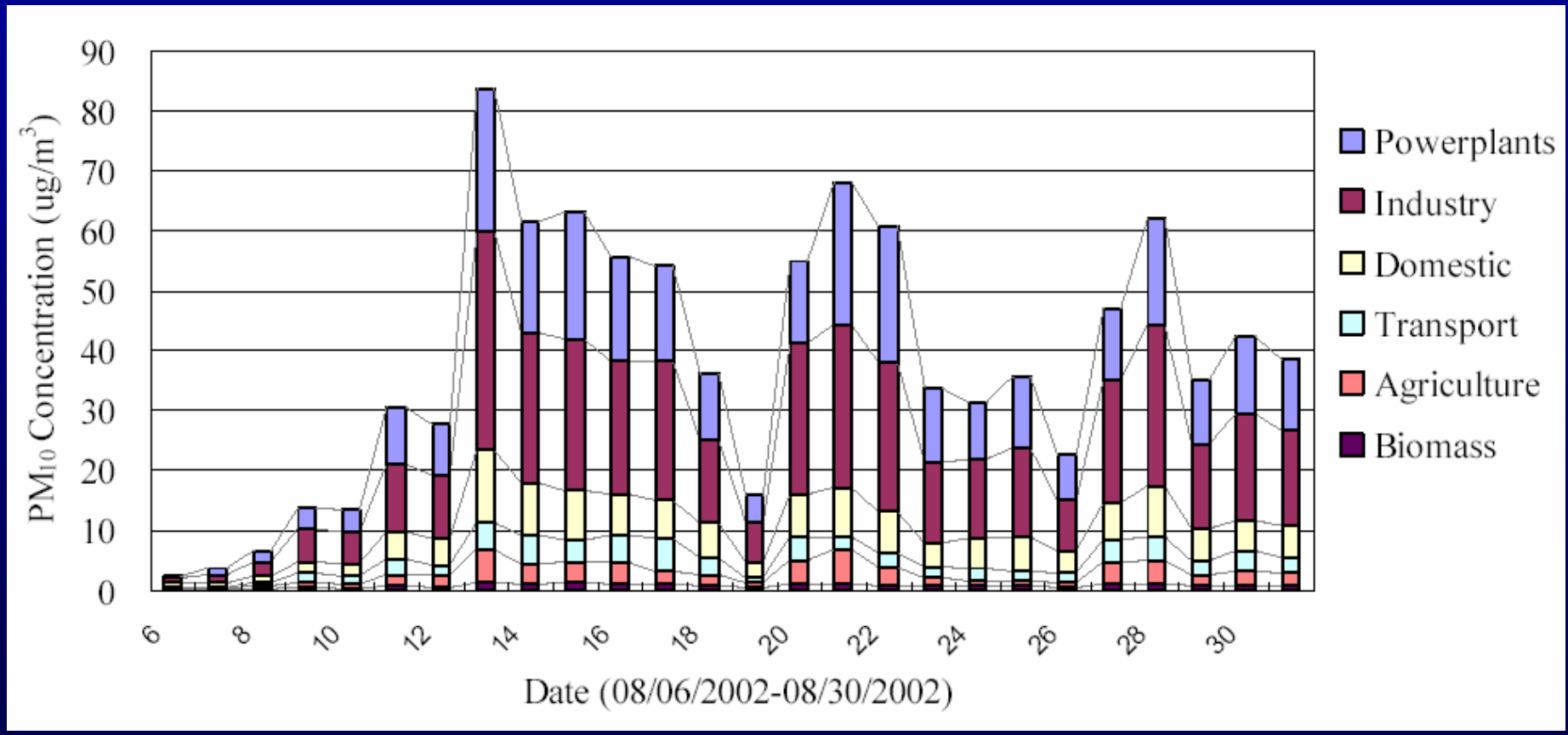
- **Atmospheric simulations**
  (understanding of cross-border atmospheric pollution)

Example: The *Qinghua University - Toyota Research Center* (established in 2006) is conducting research on the atmospheric environment, such as air quality simulations in Beijing

Example: Estimation of Emissions Sources by Atmospheric Simulation

(Conducted by Toyota Central R&D Labs, Inc., Qinghua University, and others.)

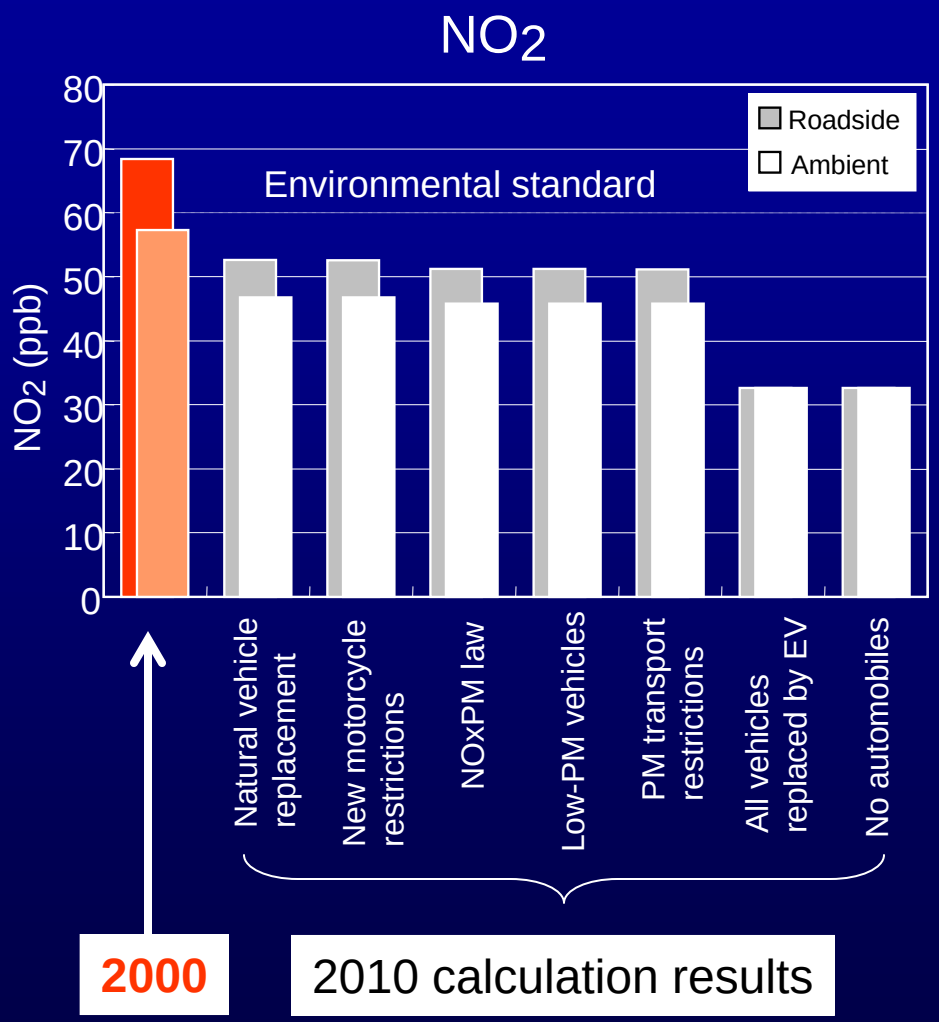
Calculated PM_{10} sources (at one sample point in Beijing)

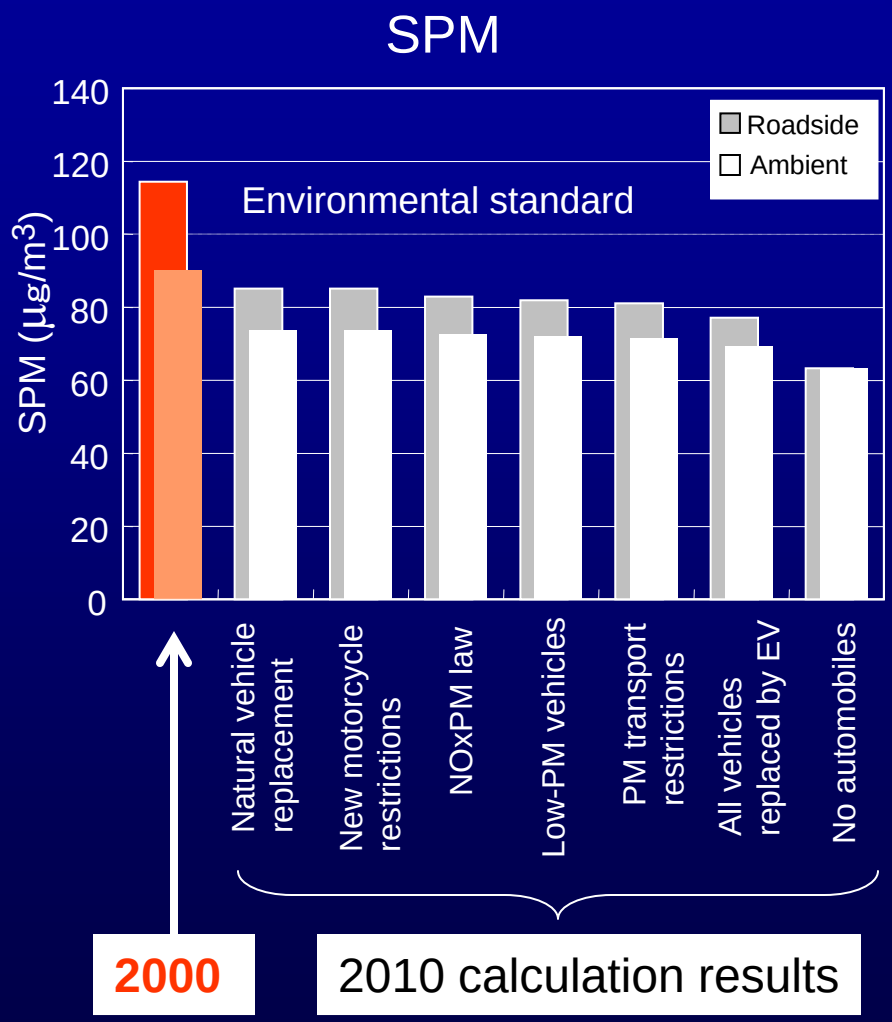


(Source: "Modeling Study on PM_{10} Pollution in Beijing: Regional Source Contributions and Control Implications to 2008 Summer Olympics" Litao Wang et al.)

Example: Atmospheric Simulation (23 Tokyo Wards, 2010)

Current and projected average concentrations at ambient/ roadside air pollution monitoring stations in the 23 Tokyo wards





(Source: Central Environmental Council, Special Committee on Automobile Emissions, 2004)

Measures Related to Automobiles

Primary areas for measures aimed at reducing emissions:

(1) Individual vehicles

(2) Fuels

(3) Infrastructure

(4) ITS (Intelligent Transport Systems)

(5) Non-government voluntary activities

(6) Government policies

(7) Education and personnel training

Example: TDM Activities in Toyota City

(TDM: Transport Demand Management)

[Measures taken]

- Change in modes of commuting
  (2000 private vehicles replaced by public transit.)
- Staggered commuting
- Park & ride

  +

- Road maintenance
- ITS

<Before maintenance>

From “Creating 4 Lanes for Highway 248 from Toyota-cho to Koromo-cho” (published by Aichi Prefecture)

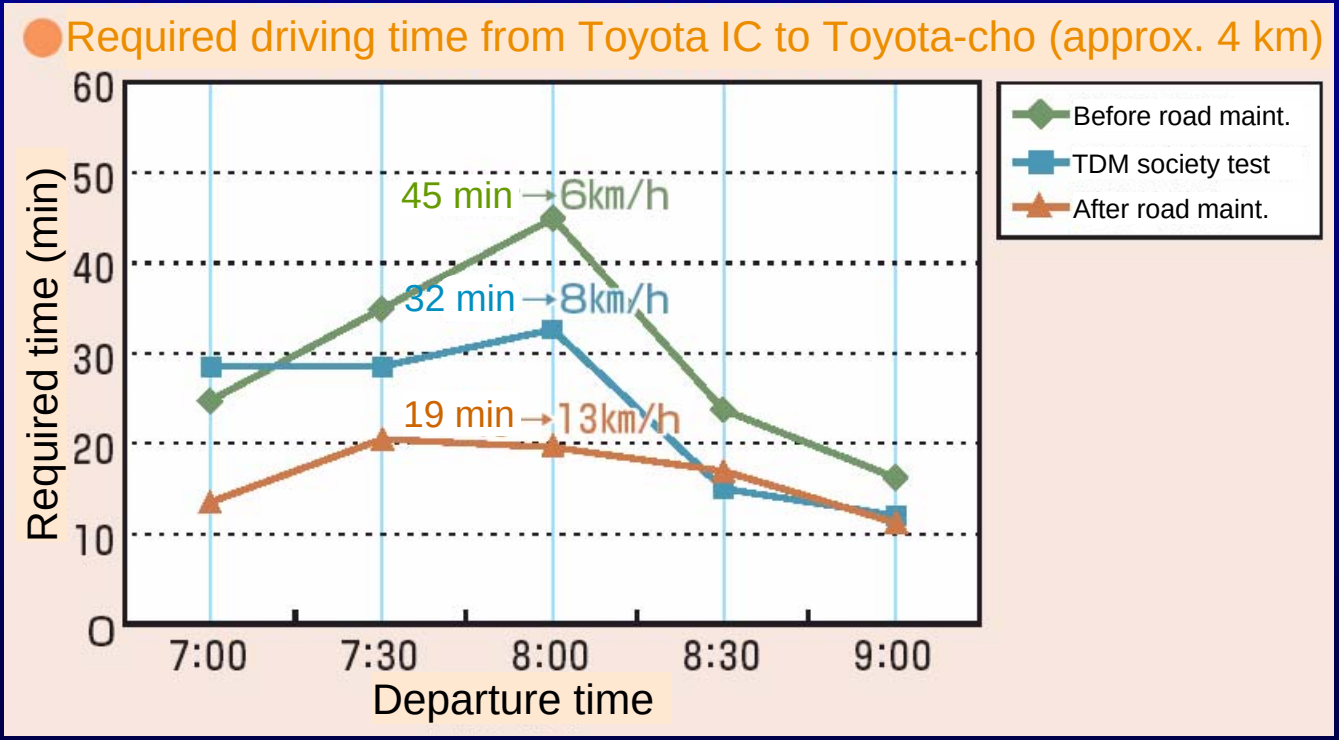
<After maintenance>

- Wider road
- Creation of left-turn pocket
- Optimized traffic signal control

Results of Toyota City TDM Activities

Results of modal shift
Time required: ↓ 30%
CO_2: ↓ 14%

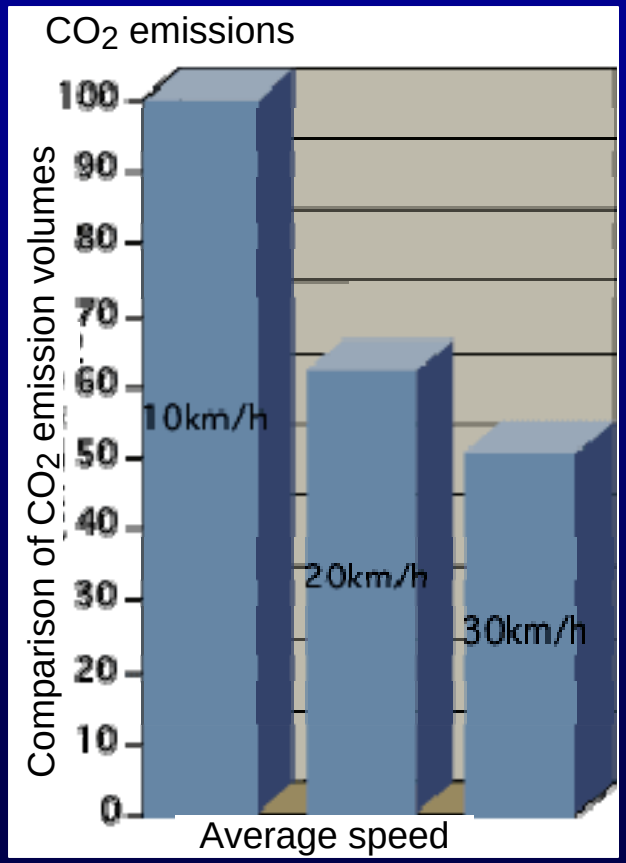
+ Results of road maintenance
Time required: ↓ 60%
CO_2: ↓ 17%

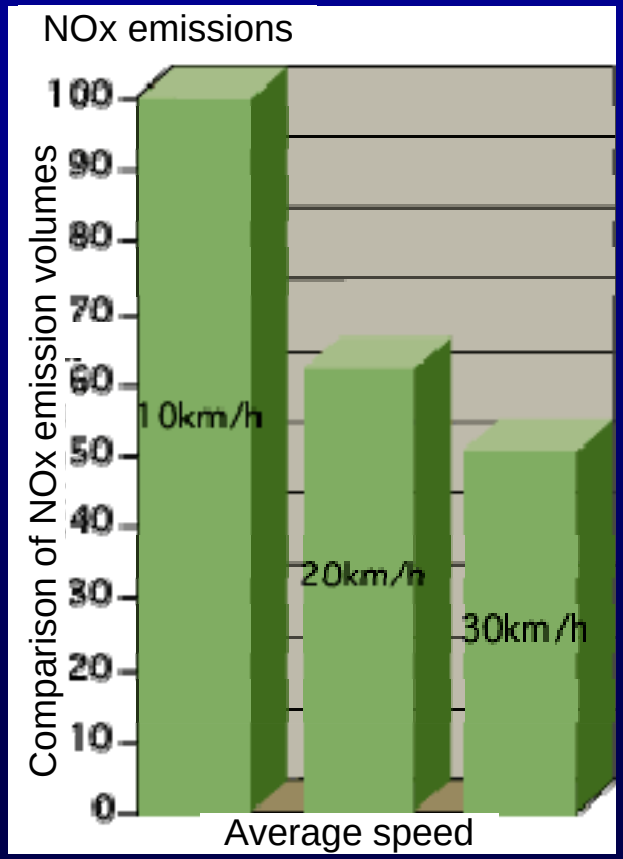


While traffic volume increased, the higher driving speeds reduced CO_2 emissions.

Emission Decrease with Increasing Driving Speed

The increased driving speed leads to reductions in both CO_2 and NOx emissions.





Example: ITS in China

- The ITS World Congress will be held in Beijing in December of this year. Support is provided by ITS-Japan (chairman: Shoichiro Toyoda), which works to promote ITS in cooperation with industry, government, and universities.

- ITS-Japan is providing support for the installation of VICS (Vehicle Information Communications System) in Beijing.

- Together with the Chinese government, Toyota is installing ETC systems and conducting demonstration tests. Currently, these efforts are continuing, with the on-site cooperation of the Japanese government.

Example: Personnel Training in China

- Automobile maintenance training

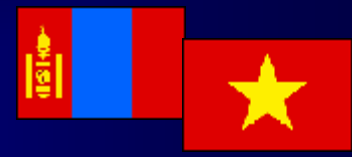
Example: Toyota is providing global support for automobile maintenance training, through a program called T-TEP (Toyota-Technical Education Program). In China, the T-TEP program has been introduced at 27 schools, including the Beijing Communication School, and this program has produced a total of more than 30,000 graduates.

- Cooperation with environmental training

Example: Contests are held for environmental protection projects among Chinese youth, with Toyota providing support for these projects.

China-Japan Alliance Against Air Pollution

Sustainable Development of East Asia



Industries (automobiles, etc.)

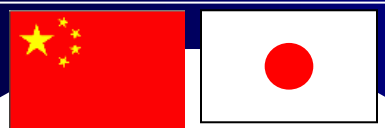
Professionals (universities, research facilities, etc.)

Office of China-Japan Alliance Against Air Pollution
(both governments)

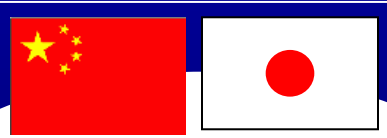
Atmospheric monitoring and simulation

Measures related to automobiles

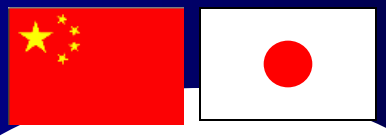
Personnel training



- Establishment of atmospheric environment standards
- Using simulations to predict the effects of measures



- Coordinate and carry out key measures in areas such as automobiles, fuels, and infrastructure.



- Raising the environmental awareness of the citizens
- Developing researchers and specialists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