Japan Clean Air Program

Program Objectives and Design

2000 SAE International Spring

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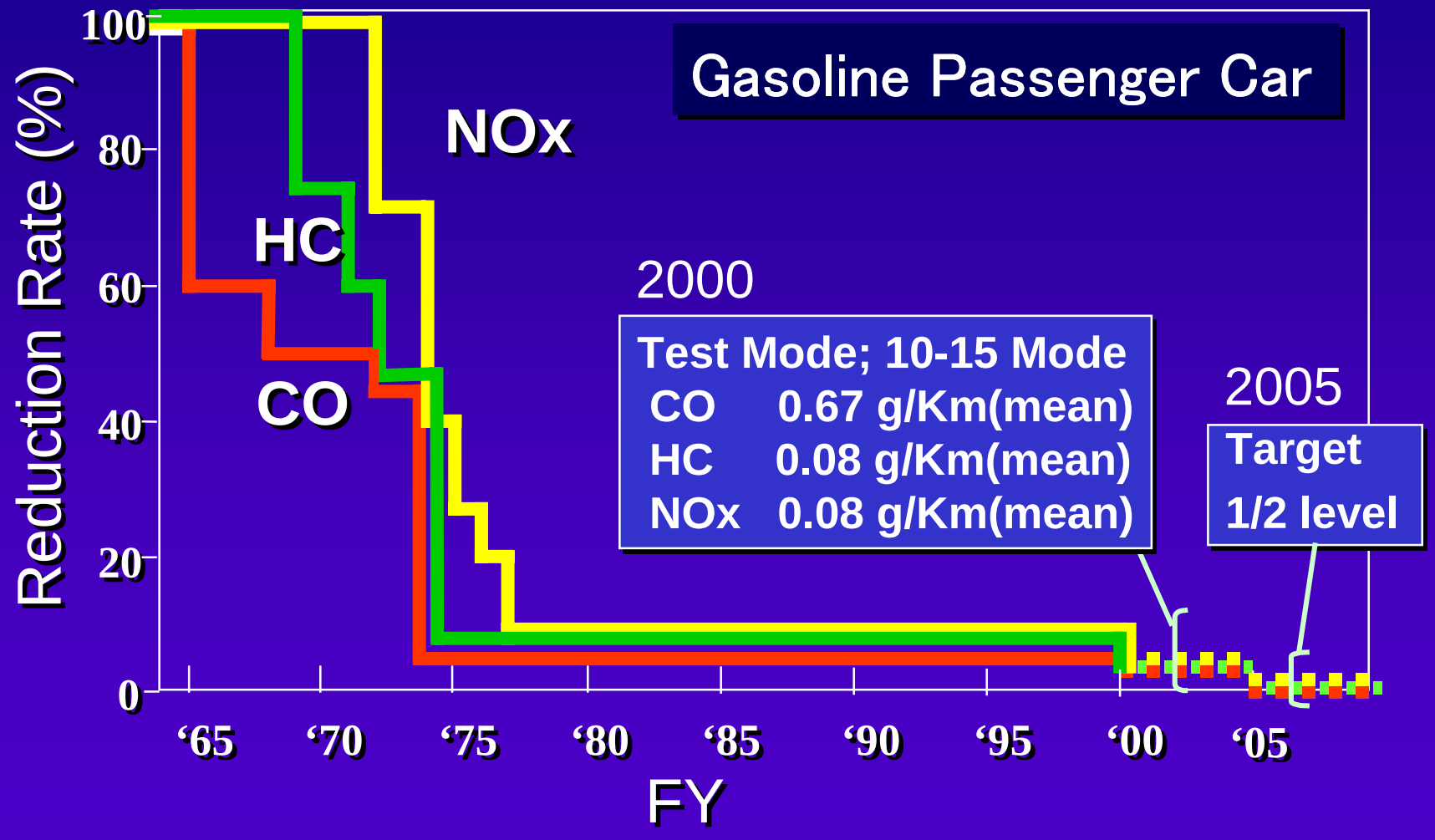
Outline

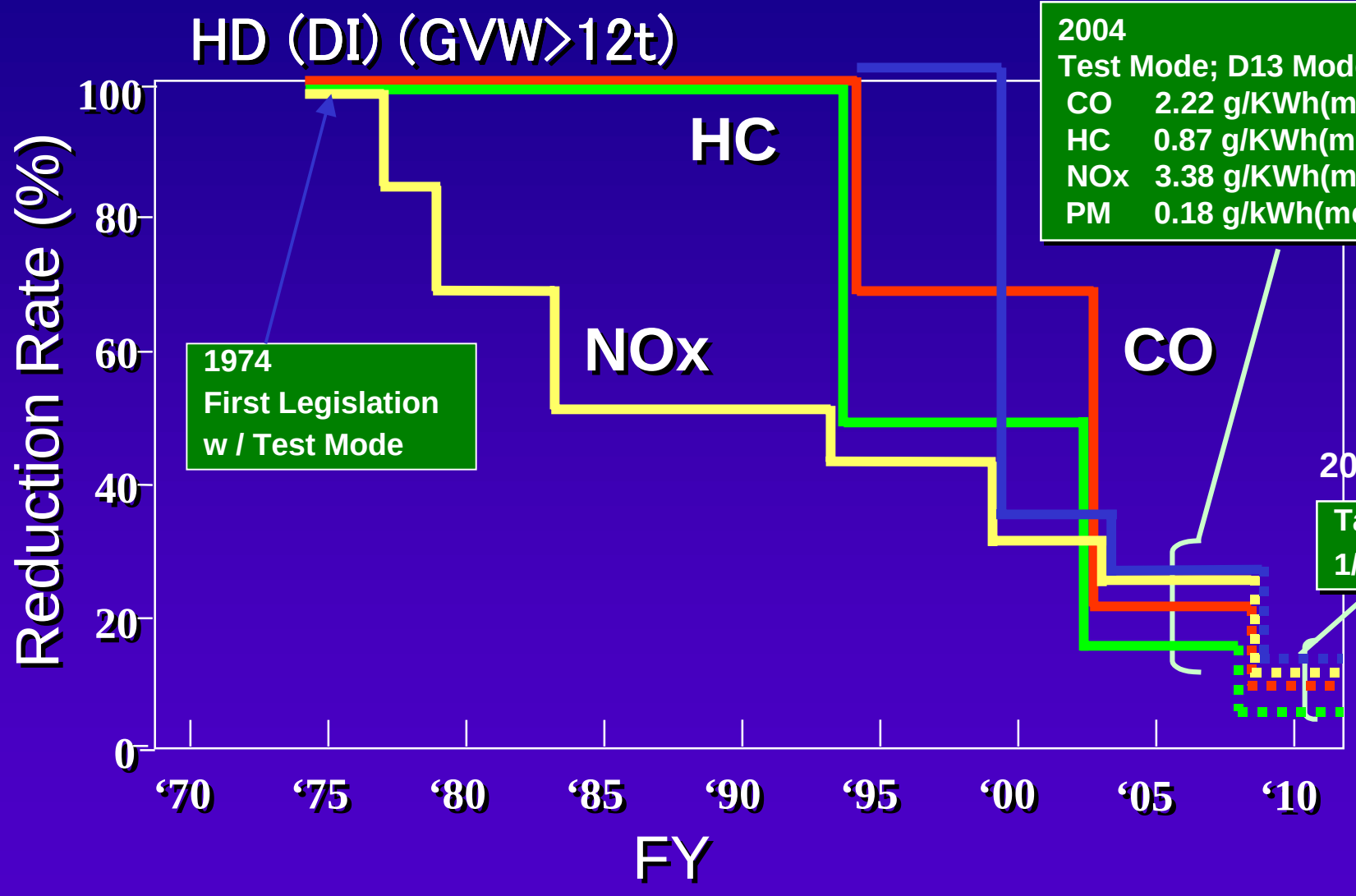
1. Introduction
2. Japan Clean Air Program
   - Objectives
   - Scope
   - Program design

   additional program for Tokyo Issue
3. Summary

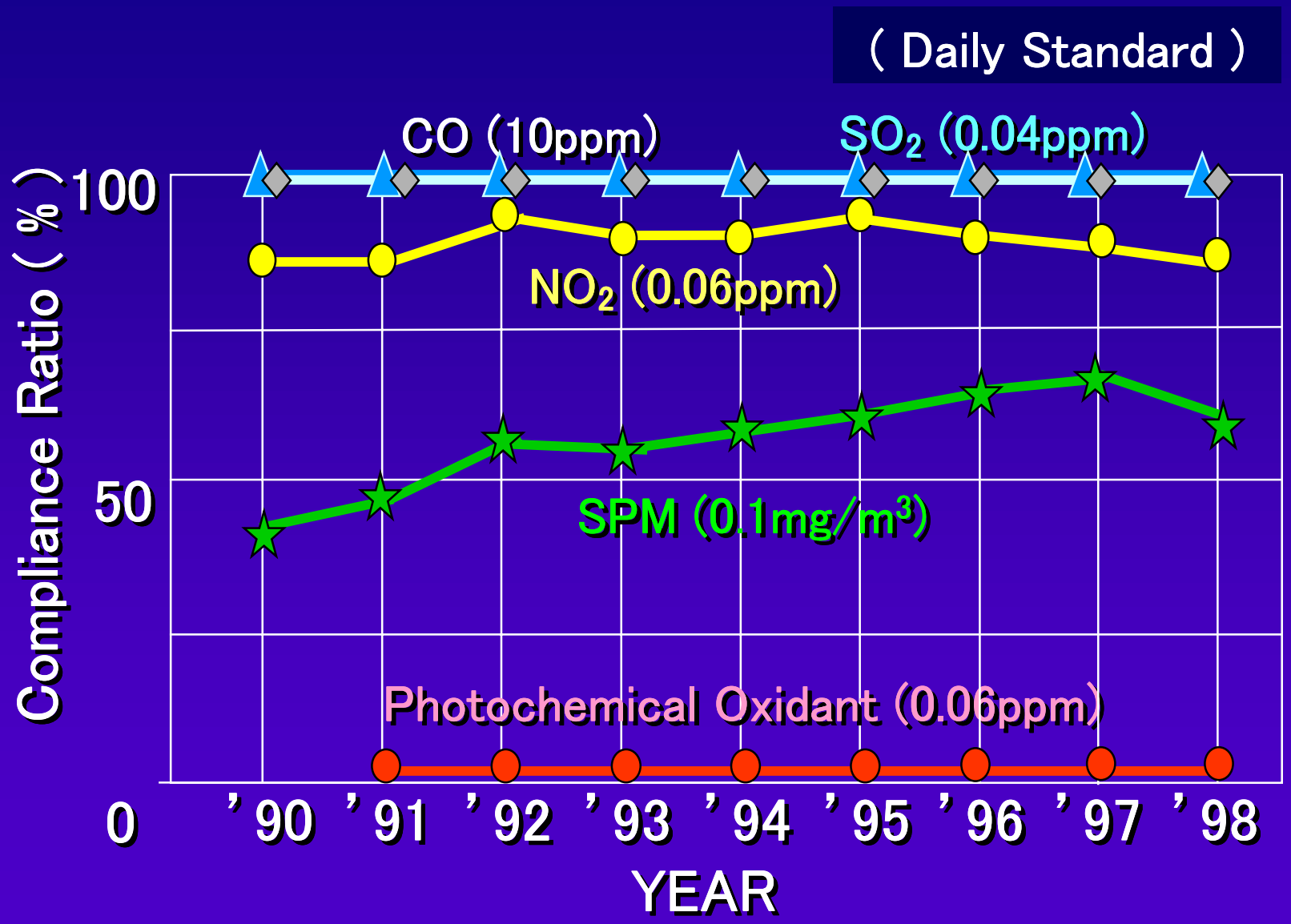
Emission Regulation in Japan



Emission Regulation in Japan

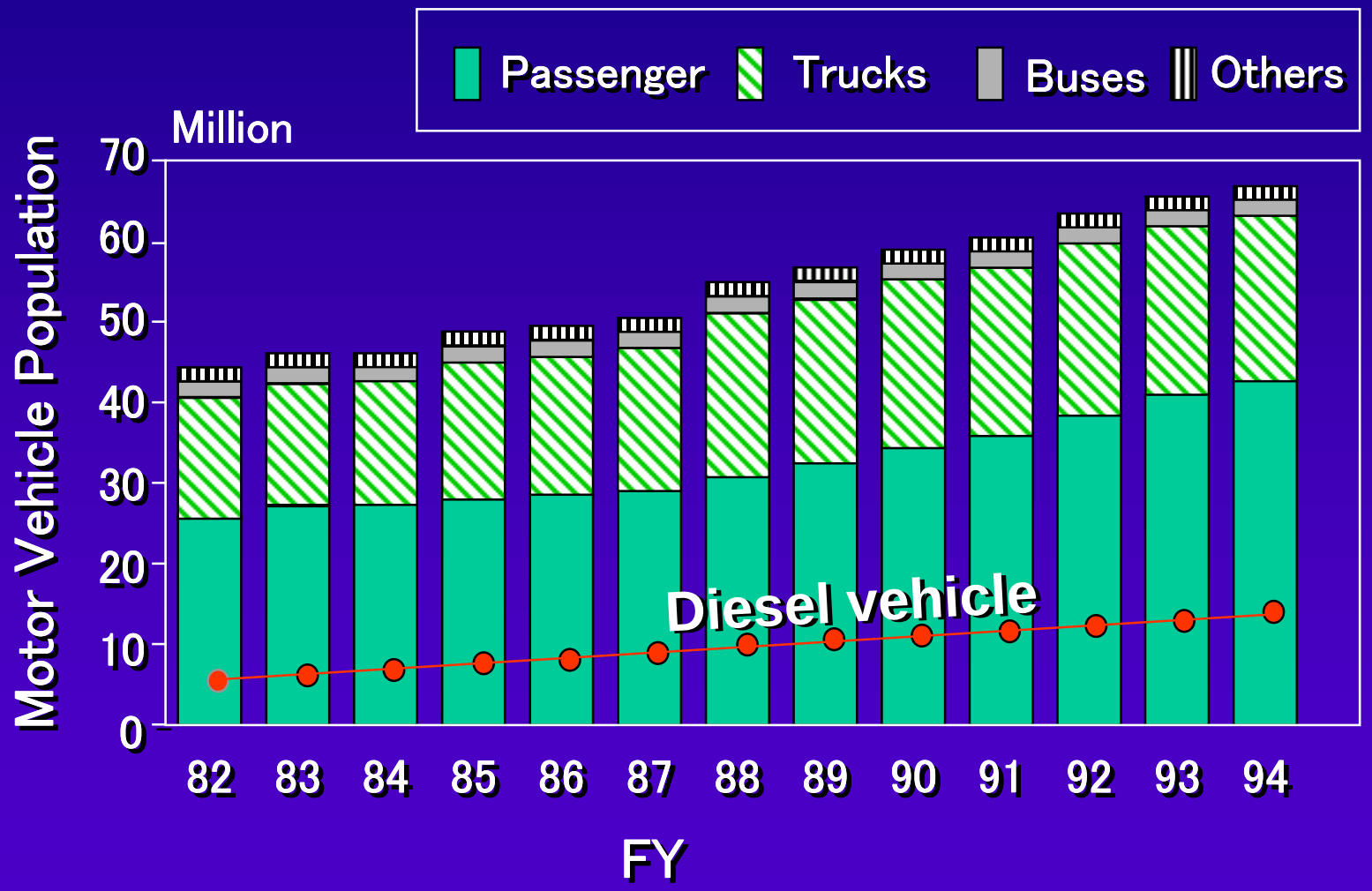


Air Quality Level in Japan



Source:Environmental Agency of Japan "Quality of Environmental in Japan"(1998)

Population of Motor Vehicle



Source:Japan Automobile Manufacturer Association

Fuel Quality Control in Japan

			Market average
Gasoline	Lead	Not Detected	
	Sulfur	0.01 wt% max	30(10)ppm
	Benzene	5 vol% max 1 vol% (From 2000)	
	MTBE	7 vol% max	0
Diesel Fuel	Sulfur	0.05 wt% max	350ppm
	Cetane I	45 min	56
	T90	360℃ max	330

OBJECTIVES OF JCAP

- Provide scientific data of vehicle and fuel technologies based on the Japanese Vehicle and Fuel at Japanese driving cycles
- To Develop combinations of future vehicle and fuel technologies
- To Provide scientific data for policy formulation in terms of cost-effectiveness

SCOPE

Common concerns of

both oil industry and auto industry

regarding reducing vehicle emissions

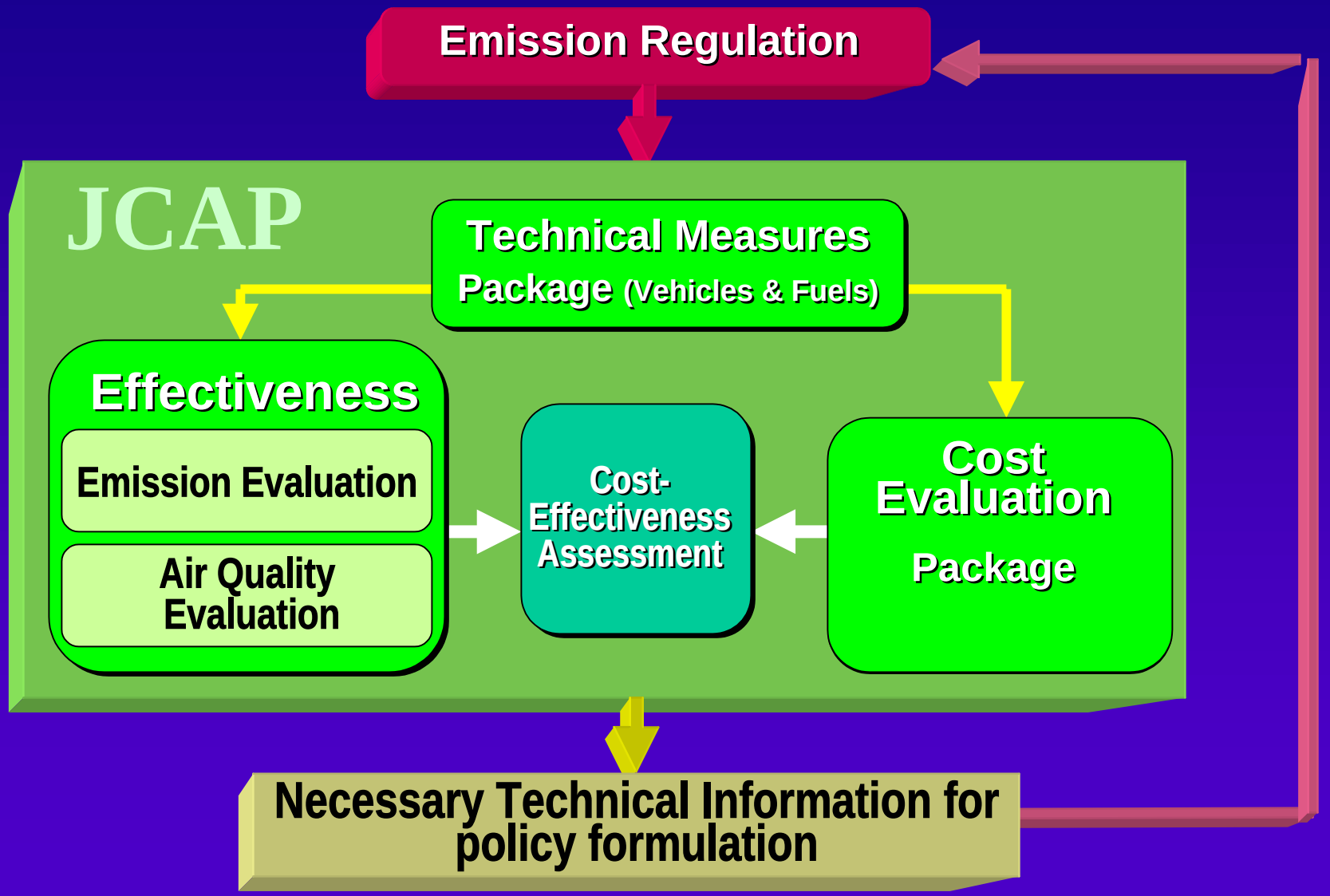
Focus on

Road Transportation Vehicles and

Road Transportation Fuels produced from Petroleum

Aim to Improve air quality in 2010

Scheme of JCAP Approach



JCAP Organization

Evaluation Committee

Research Committee

Working Groups
- Gasoline WG
- Diesel WG
- Air Modeling WG
- Test Methods WG
- Cost Studies WG
- Combustion Analysis WG
- Health Effects Study WG
- JCAP Coordination WG

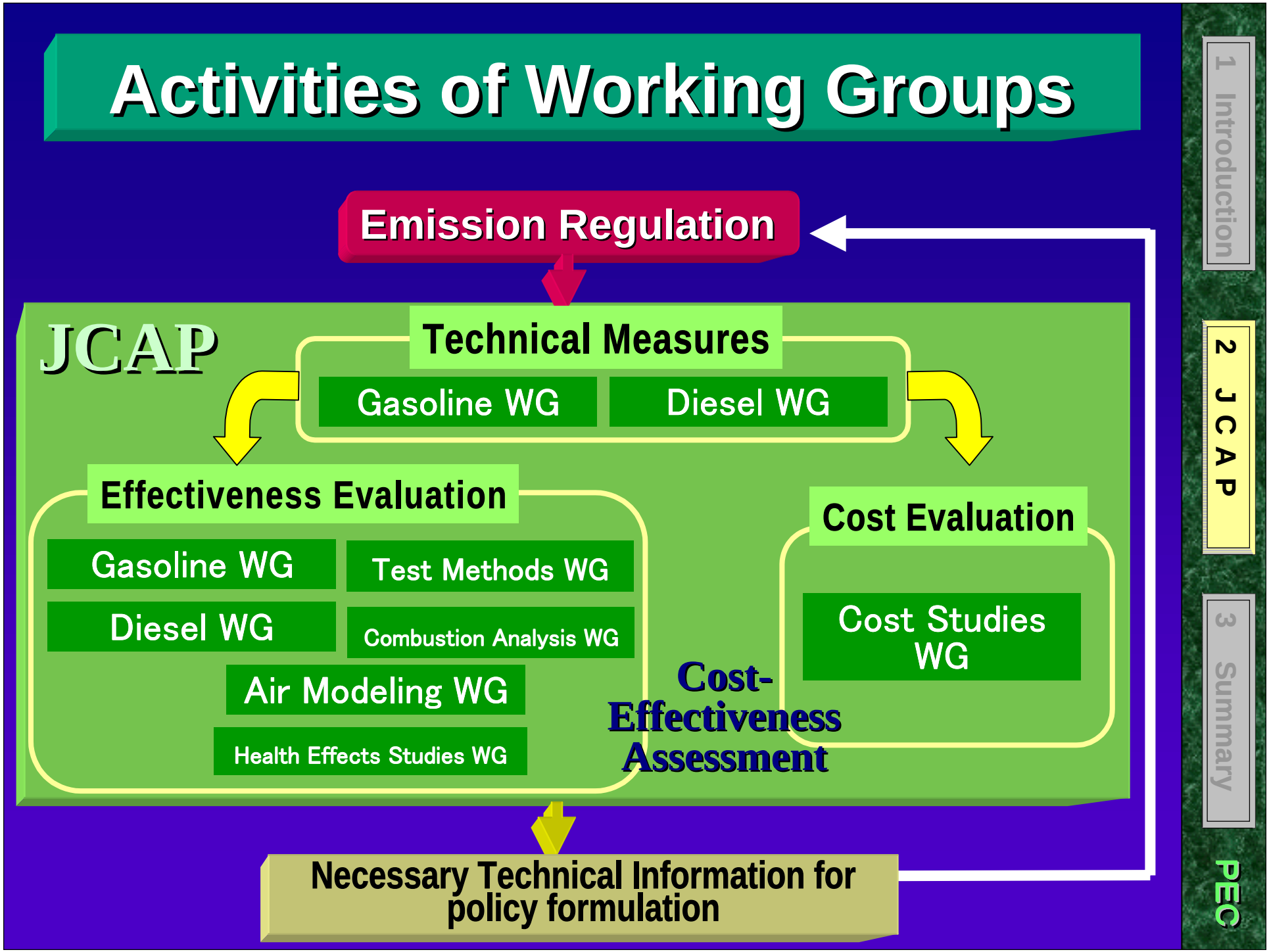
MITI
Agency of Natural Resources and Energy

JCAP Promotion dept.
Petroleum Energy Center

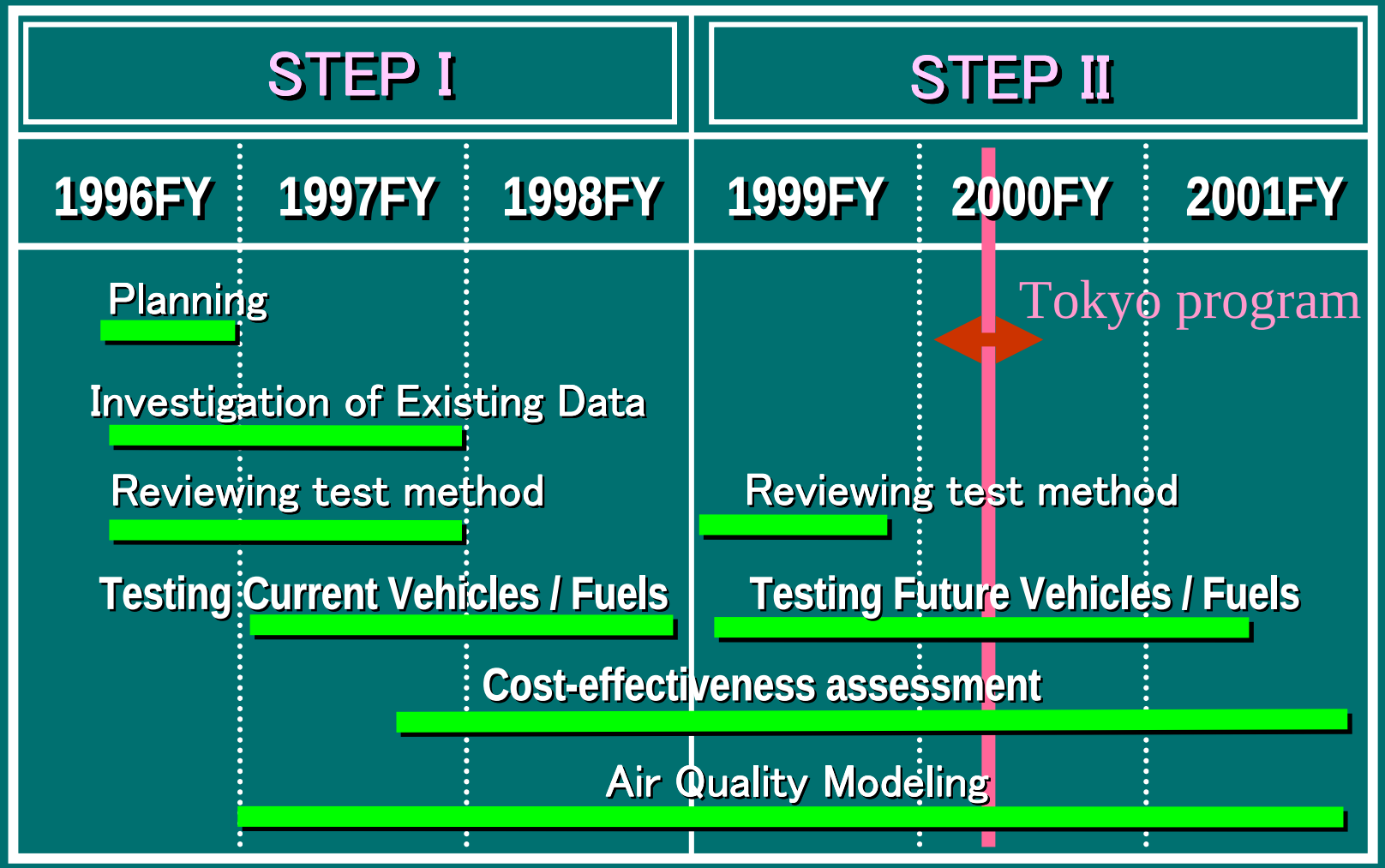
JARI
Japan Automobile Research Institute

ATRI
Advanced Technology and Research Institute

Activities of Working Groups



Schedule of JCAP



Program Design

	Emission Regulation	Effect Evaluation		Cost Evaluation
		EM Evaluation	Air Quality	
STEP I	Current	Current Vehicle x Fuel Matrix test	BASE	BASE
	Future(Next) G: 2000 D: 2002	Model Vehicle x Fuel Matrix test	Preliminary Study	
STEP II	Future Target G: 2005 D: 2007	Future Vehicle x Fuel Matrix test Durability test	Future Technology Evaluation and Cost effectiveness Assessment	

Program Design（STEP Ⅰ）

Emission evaluation of current technologies

Vehicle / Engine x Fuel Matrix test

Regulation		Test Vehicle/Engine	Test Fuel
Current	Gasoline	13 veh. & 2mopets Incl. DI and Lean mixture	7 RVP, Aroma Sulfur, Benz
	Diesel	10 veh. & 8engines	5 Aroma T90
Next (2000)	Gasoline	4 vehicles 3 Prototype & 1 LEV	2 Low RVP RFG Ⅱ
Sub-Program	Diesel	4 veh.& 3engines W/3technologies;cat、DPF	8 Aroma T90、Sulfur

Air Quality Prediction / Cost Evaluation

Model Development : Air Model、Cost-effectiveness Model

Preliminary studies : Baseline、Evaporative emission system

Program Design (STEP II)

Development of vehicle and fuel technologies to meet the emission target in 2005-7 in terms of cost-effectiveness

- **Vehicle / Engine x Fuel Matrix test**

	Regulation	Test Vehicle/Engine	Test Fuel
Gasoline vehicle	EM target in 2005	Matrix : T.B.D.	T.B.D.
		Durability : 4vehicles	3 (sulfur)
Diesel vehicle	EM target in 2007	Matrix : 7veh. & 7eng.	8（S & T90)
		Durability : T.B.D.	T.B.D.

- **Prediction of air quality in 2010**
  Including secondary PM formulation and pollutant dispersion at roadside
- **Cost evaluation for Future technologies**
- **Cost -effectiveness Assessment**

JCAP shows the flexibility on Tokyo Issue

Tokyo Metropolitan Government Announcement

Mandate of DPF for Diesel

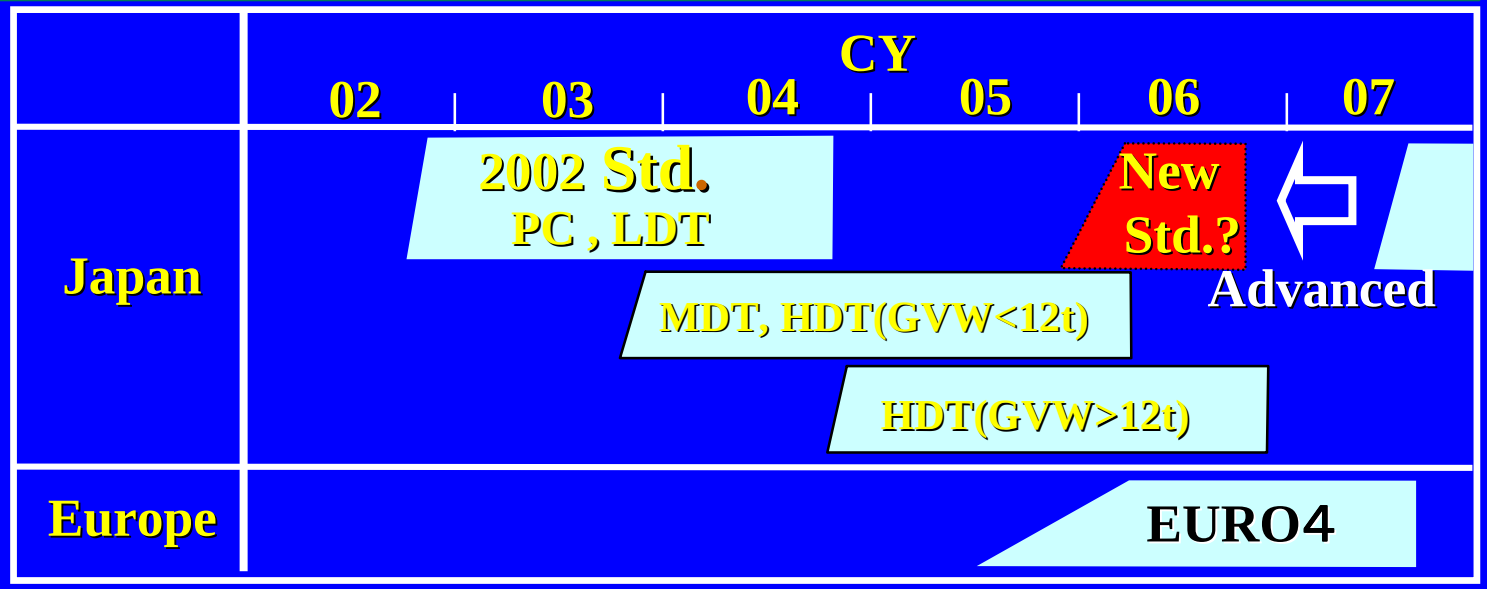
Lack of Data on DPF

JCAP assists to find a solution
by accelerating and adding additional test program

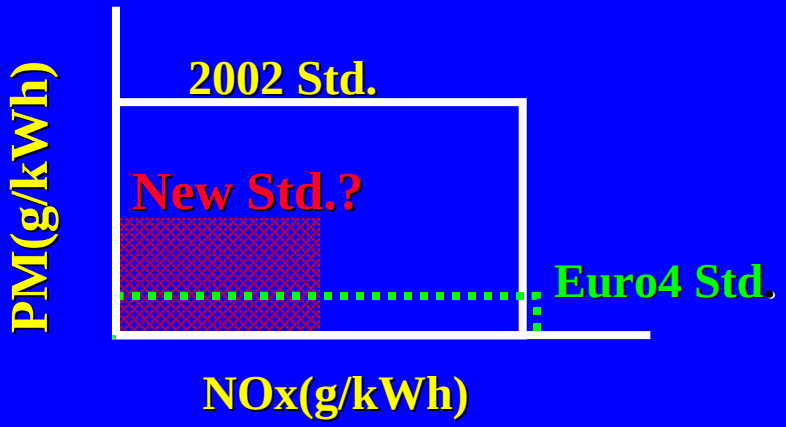
Test and report of the test data with the several DPF
Calculating the air-quality of several measures

Council for finding the solution for diesel problem

Diesel Vehicle Emission Regulation Schedule

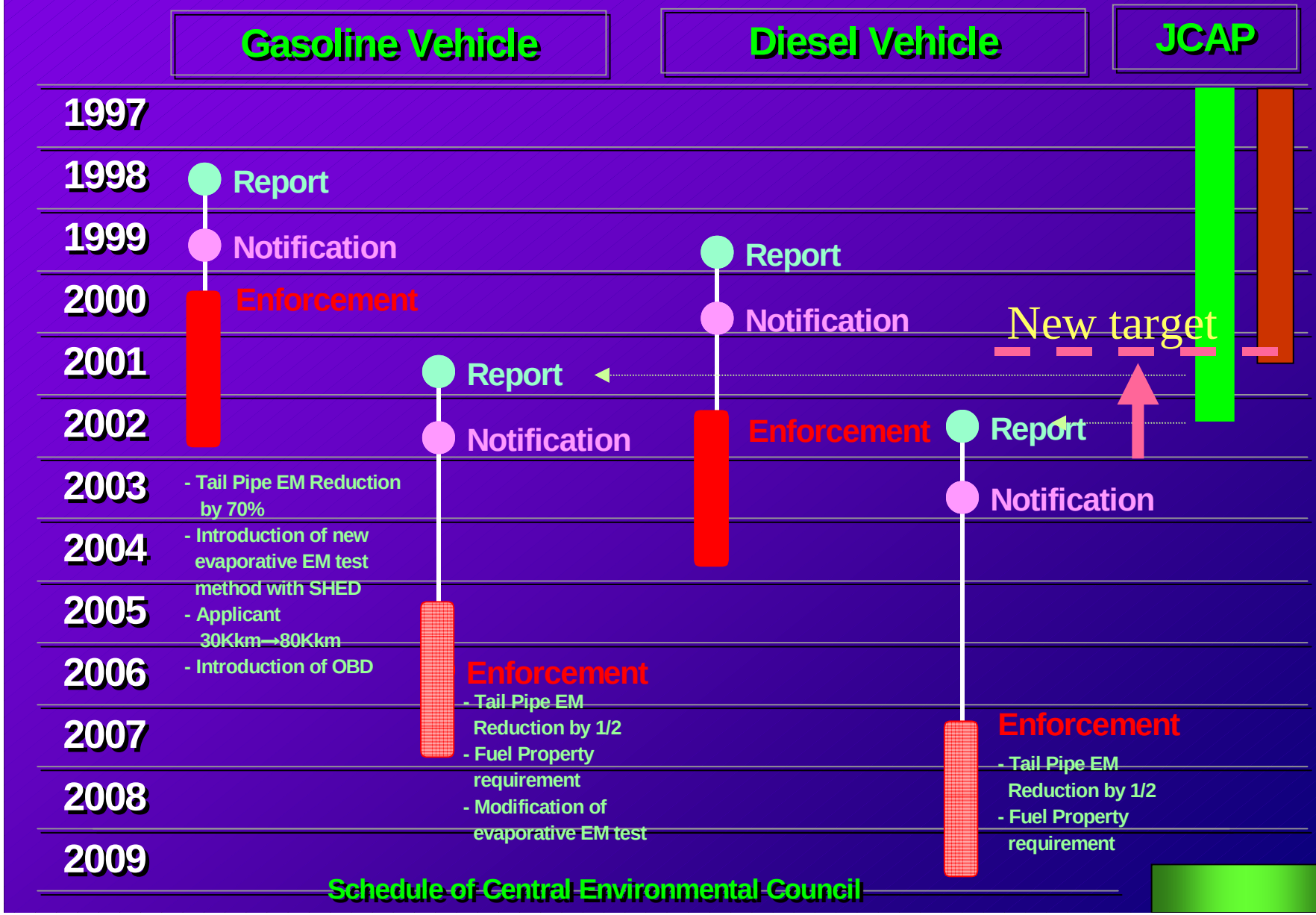


<Reference>
Comparison between Japan and Europe Std.



Japan Clean Air Program

Future Regulation in Japan



Summary

- PEC started JCAP in 1996, in cooperation with PAJ and JAMA. Annual fund around 12million$

2) JCAP attempts to maximize the transparency and impartiality of its activities.

3) The activities include combustion analysis and health-effect studies.

Summary 2

4) This program is to provide the council with technical information that will contribute to original and reasonable environmental improvements in Japan.

5) JCAP built the temporal test program to provide the scientific data for the Tokyo issue.

Fuel Quality Control (Japan)

Air Pollution Control Law

Set maximum permissible limits for the purpose of controlling air pollution

・on the amount of exhaust gases from motor vehicles → Road Transportation Vehicles Law (establish necessary matters on the control of emissions of motor vehicle exhaust)

・on the quality and quantity of substances in fuel
(no penal provisions for fuel over maximum permissible limits)

The Minister of International Trade and Industry shall take care to secure the limits in cases where he set regulation of fuel by his order.

Law on the Quality Control of Gasoline and Other Fuels

Set the regulation of gasoline, heating oil and diesel fuel by order of the Ministry of International Trade and Industry for the purpose of environment and safety
(penal provisions for fuel not to fit the regulation)

◆Diesel Fuel Quality

Sulfur	0.05wt% max
Cetane Index	45 min
T90	360℃ max

Tokyo Metropolitan Government Action for Diesel

Say No! to Diesel Vehicles Campaign Started (Aug. 27, '99)

Phase2 Started (December 16, 1999)

A Program of Measures for Diesel Vehicles Drafted (February 18, 2000)

a) Prohibit the passage of diesel vehicles not fitted with diesel particulate filters (DPF) in the Tokyo Metropolis (southern islands excluded).

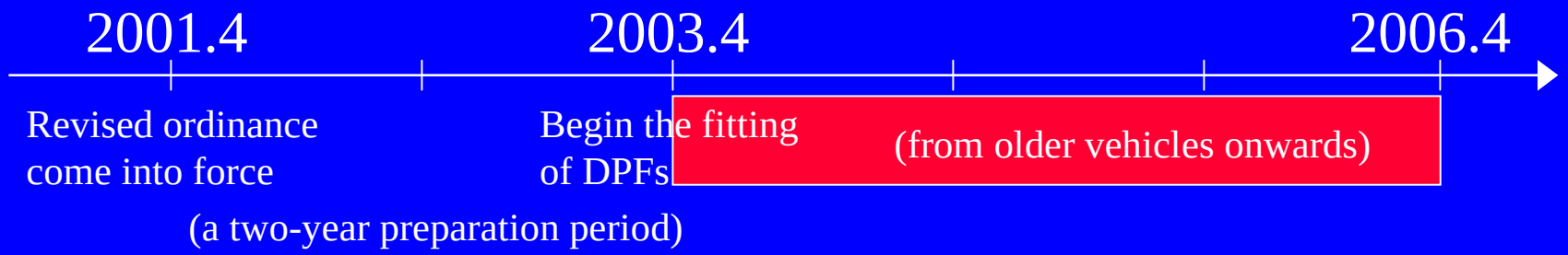
b) Require the fitting of DPFs to all diesel vehicles registered in the Tokyo Metropolis.

3. Targets of the measures

* Diesel vehicles registered in the Tokyo Metropolis: approx. 650,000 vehicles

* Diesel vehicles passing through the Tokyo Metropolis (vehicles registered in other prefectures): approx. 240,000 vehicles per day (estimate)

4. Schedule



A Program of Measures for Diesel Vehicles Drafted by Tokyo Metropolitan Government

As a major outcome to the “Say No! to Diesel Vehicles” campaign begun in August 1999, Tokyo Metropolitan Government (TMG) drafted a program of measures for diesel vehicles in February 2000.

The draft will be finalized after deliberation at the TMG Environment Council (the council finally reported on March 31,2000).

Outline of the measures for diesel vehicles

1. Purpose

Revise TMG's ordinance for pollution control to reduce emissions from diesel vehicles to protect Tokyo citizens from air pollution caused by particulate substances and other pollutants in diesel emissions.

2. Major measures

a) Prohibit the passage of diesel vehicles not fitted with diesel particle filters (DPF) in the Tokyo Metropolis (southern islands excluded).

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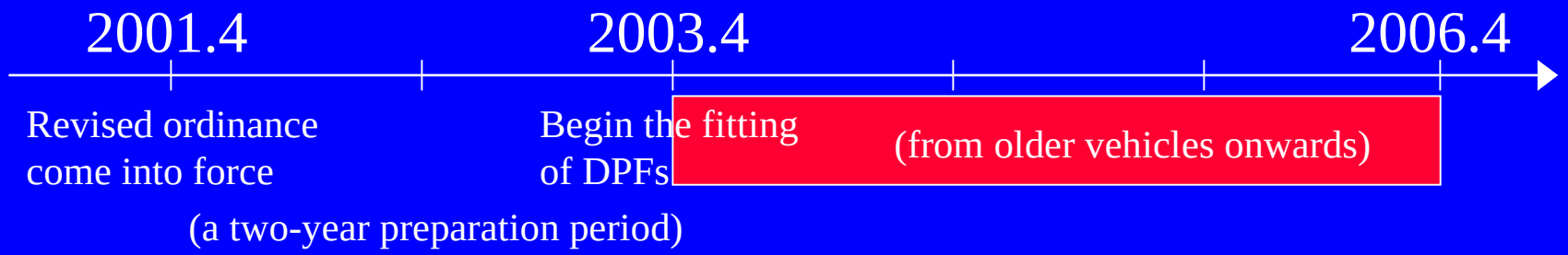


* The regulation shall not immediately be applied to models conforming to current and 1994 standards that were registered (i.e. as new vehicles) before the revised ordinance came into force. (These vehicles are given a 5-year pending period from the time of registration.)

5. Other measures

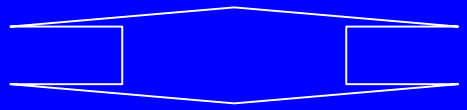
a) Mandate information disclosure to dealers of diesel vehicles
b) Request vehicle manufacturers to cooperate
c) Mandate a report from businesses in Tokyo
d) Examine the possibility of on-the-spot inspections of and guidance to businesses in Tokyo

* During the pending period TMG shall publicize the new regulation and encourage the owners of diesel vehicles to either fit their vehicles with DPFs or to replace them with gasoline or other less-polluting vehicles.

Current situation of examination for new diesel regulation in Japan

Central Environment Council (Environment Agency)

- To discuss the reduction of exhaust gases and the fuel quality
  1) early introduction of new legislation (2007 ⇒2005 or 2006?)
  2) early reporting of new legislation (2002 ⇒ 2000 or 2001?)



Reciprocal relation

Petroleum Council (Ministry of International Trade and Industry)

- To discuss the fuel quality
  1) sulfur level in diesel fuel where necessary to achieve new long-term target
  2) policy to encourage early introduction of low sulfur diesel

Tokyo Metropolitan Government Action for Diesel

Say No! to Diesel Vehicles Campaign Started (Aug. 27, '99)

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Open Forum

- No.1: DPF Symposium (March 22, 2000)
- No.2: Diesel Alternative Vehicle (May 12,2000)
- No.3: Environmental Issues (June 2, 2000)

DPF Tests on Vehicle (June, 2000)

- DPX: 1 Bus, 2 Trucks
- CRT: 1 Bus

JAMA Commitment

(Japan Automobile Manufacturers Association)

Reducing Emission in New Vehicles

Intend to Introduce Technologies into the Market around 2003-2004 in Advance of the Enforcement Date Expected in 2007.

Reducing Emission in Vehicles in Service

Comprehensive Retrofitting will be Carried Out on a Priority Basis for Vehicles Used Mainly in Large Cities.

Promoting the Japan Clean Air Program (JCAP)

A Joint Project between Petroleum Association of Japan(PAJ) and JAMA to Determine Appropriate Technologies and Fuel Properties for Reduced Vehicle Emissions

PAJ Commitment

(Petroleum Association of Japan)

Advance PM reduction in New Vehicles

To supply low-sulphur diesel fuel to vehicles with PM reduction technologies introduced into the market in accordance with the advanced enforcement date

To make voluntary efforts to supply low-sulphur diesel fuel partly to vehicles with PM reduction technologies introduced into the market in advance of the enforcement date

Promoting technology development

To concentrate in promoting JCAP to make efforts for PM reduction