

Efforts to Reduce Motorcycle Emissions in China

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Contents

- 1 Rapidly development of Chinese motorcycle industry and emission problems**
- 2. Outline of Chinese motorcycle emission control course**
- 3. Application of Catalytic converters for motorcycles in China**
- 4. Application of fuel injection systems for motorcycles in China**
- 5. Conclusions**

1. Rapidly development of Chinese motorcycle industry and emission problem

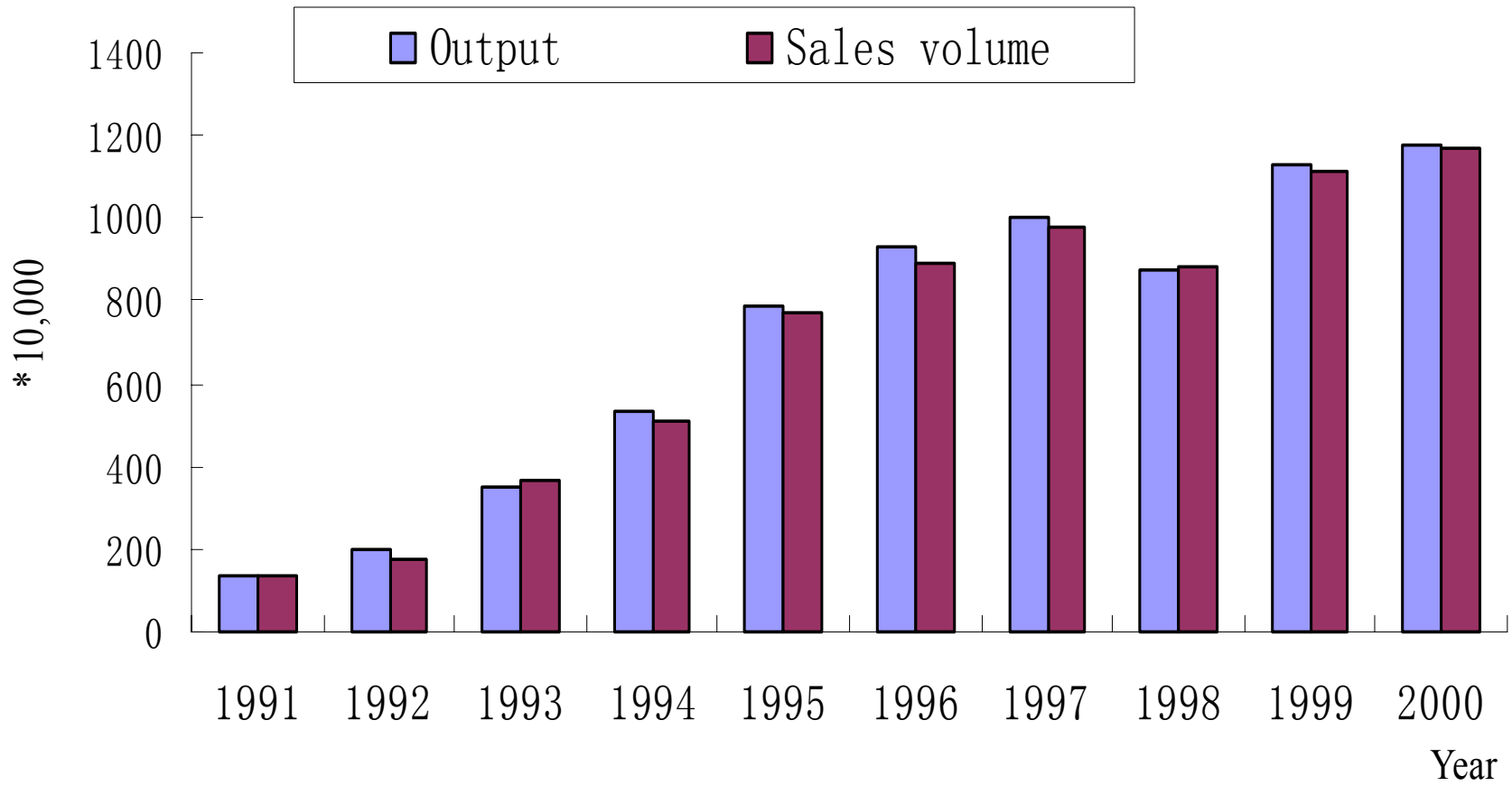
1.1 Annual output analysis

1.2 Status of Chinese 2-T motorcycle emissions

1.3 Status of Chinese 4-T motorcycle emissions

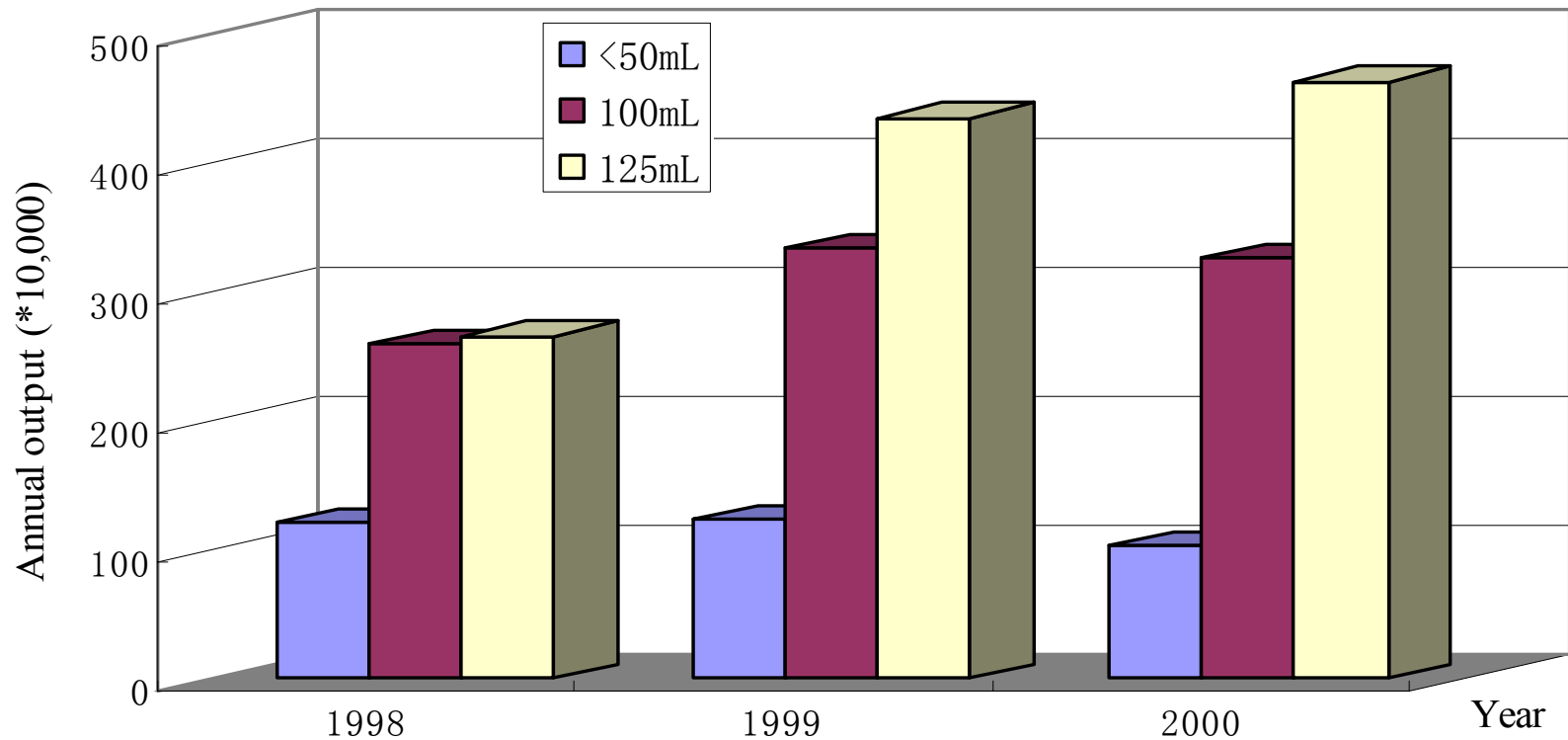
1.1 Annual output analysis

1.1-(a) Annual output and sales volume

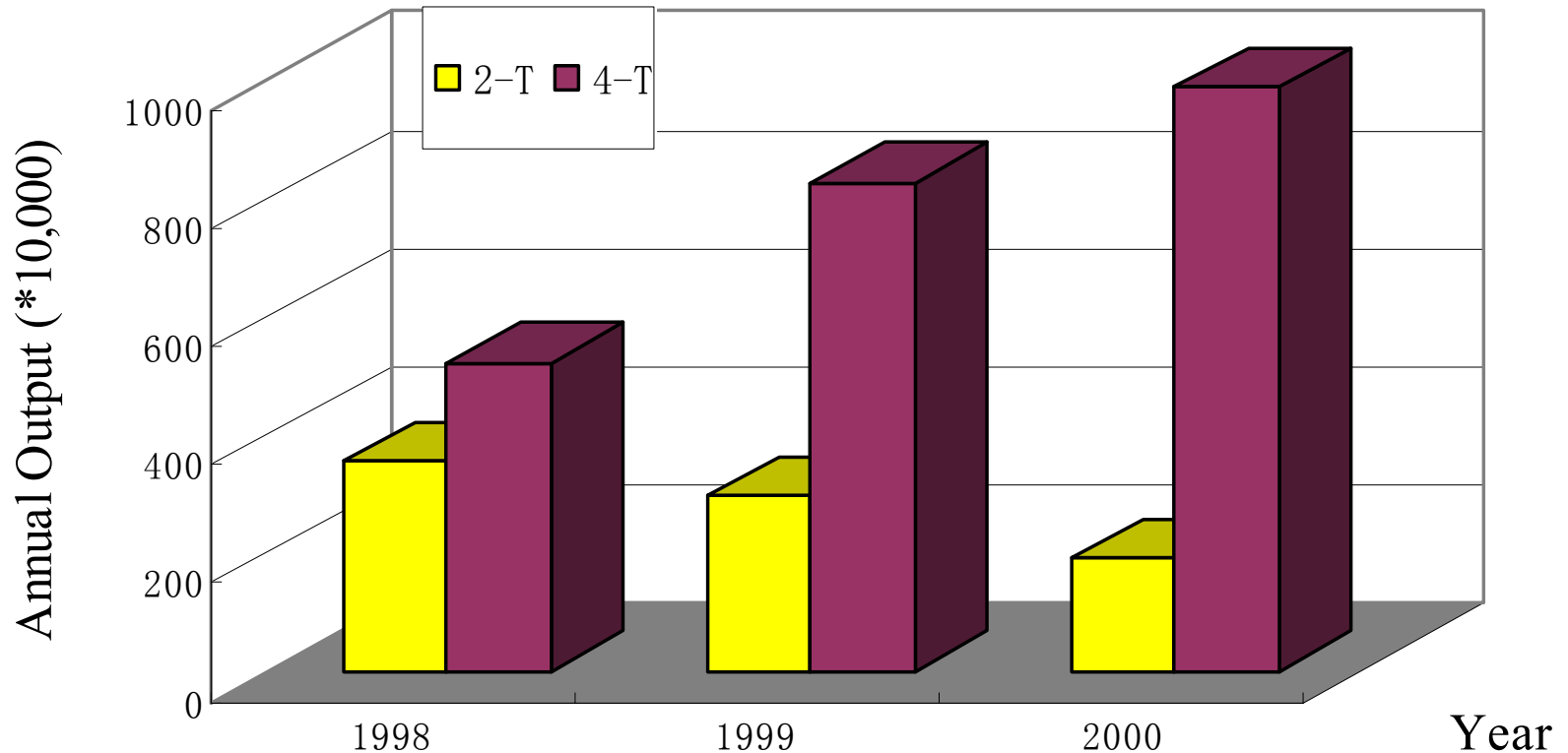


•Average augmentation of annual output from 1991 to 2000 was 27.6%

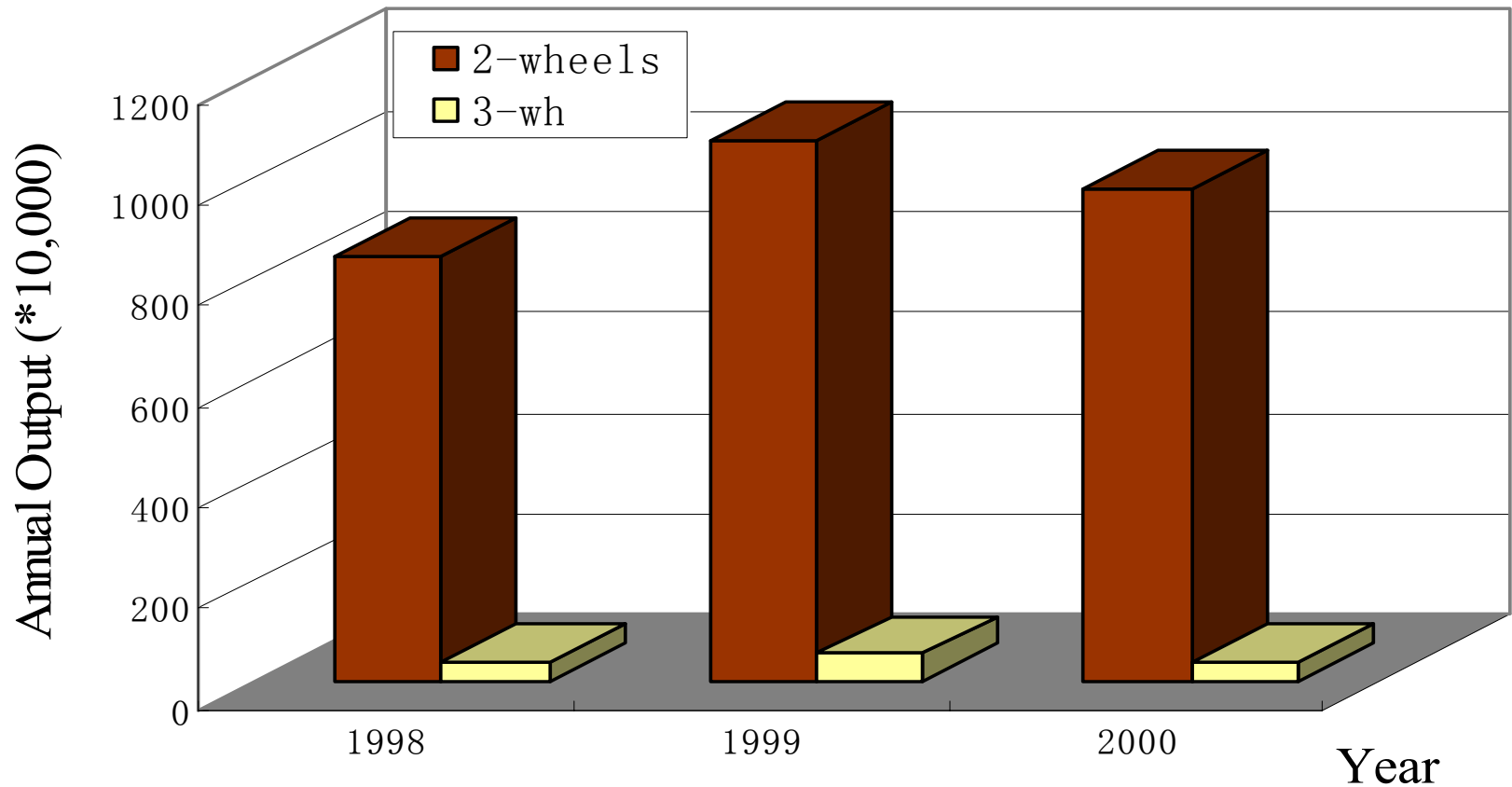
1.1-(b) Engine displacement of Chinese motorcycles were being concentrated in 50, 100 and 125 mL



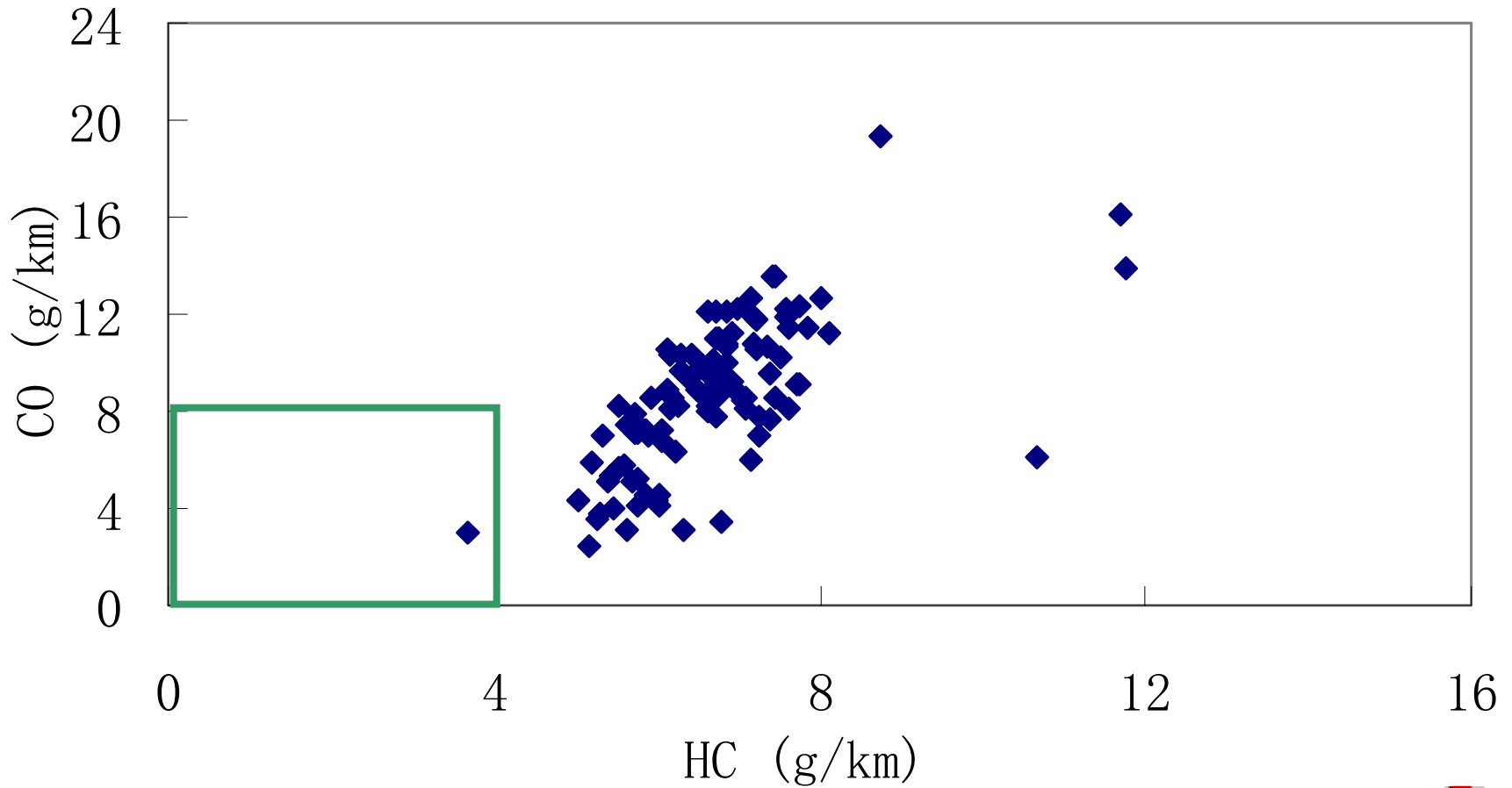
1.1-(c) Market share of Chinese 2 stroke motorcycle was being rapidly reduced to 16.17% in 2000



1.1-(d) Output proportion of 2-wheels to 3-wheels Chinese motorcycles was about 20 ~ 26.7:1

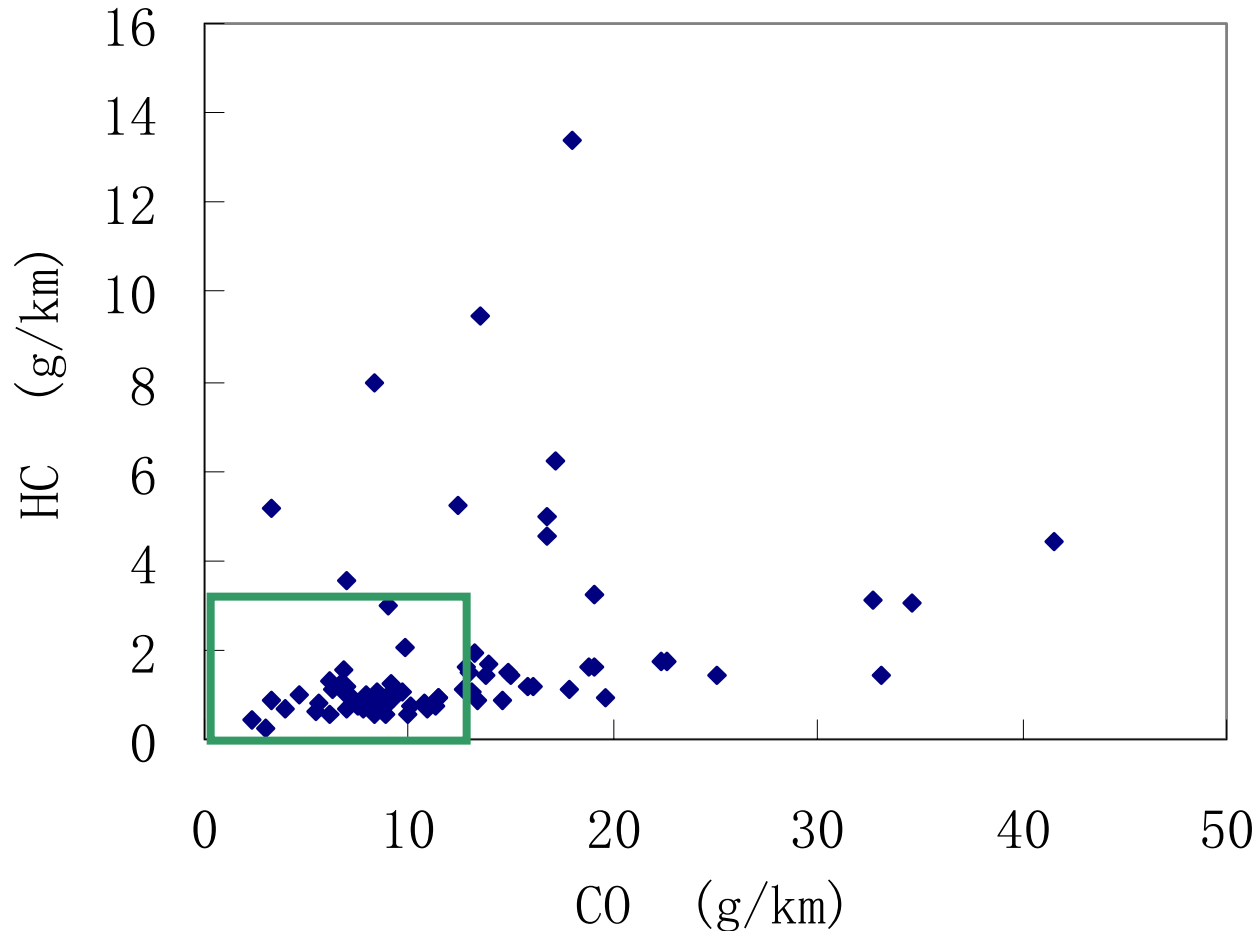


1.2 Status of Chinese 2-T motorcycle emissions



EURO-1

1.3 Status of Chinese 4-T motorcycle emissions



EURO-1

2. Outline of Chinese motorcycle emission control course

2.1 History of Chinese motorcycle exhaust regulations

- **1985**

- **GB5466-85** Measurement method for pollutants at idle speed from motorcycle
- **GB5366-85** Main performance targets for motorcycles (*Limitations*)

- **1993**

- **GB/T 14621-1993** Emission standard for exhaust emissions from motorcycle (*limitations=ECE40.00*)
- **GB/T 14622-1993** Measurement method for exhaust emissions from motorcycle under running mode (*ECE R40*)

2.2 Proposed National Emission Standards for Next Step

2.2.1 Limits and measurement methods for emissions of pollutants from motorcycles under running mode (ECE40)

	Limits (g/km)					
	Stage 1				Stage 2	
	2 Wheels		3 Wheels		2 Wheels	3 Wheels
	2-T	4-T	2-T	4-T		
CO	8	13	12	19.5	5.5	7
HC	4	3	6	4.5	1.2	1.5
NO_x	0.1	0.3	0.15	0.45	0.3	0.4

Note:

- Type-approval of stage 1 will be executed on Jan. 1st, 2002 and the conformity of production will be executed on Jan. 1st, 2003
- Type-approval of stage 2 will be executed on Jan. 1st, 2004 and the conformity of production will be executed on Jan. 1st, 2005

2.2.2 Limits and measurement methods for emissions of pollutants from mopeds under running mode (ECE47)

	Limits (g/km)			
	Stage 1		Stage 2	
	2 Wheels	3 Wheels	2 Wheels	3 Wheels
CO	6	12	1	3.5
HC+NO_x	3	6	1.2	1.2

Note:

- Type-approval of stage 1 will be executed on Jan. 1st, 2002 and the conformity of production will be executed on Jan. 1st, 2003
- Type-approval of stage 2 will be executed on Jan. 1st, 2005 and the conformity of production will be executed on Jan. 1st, 2006

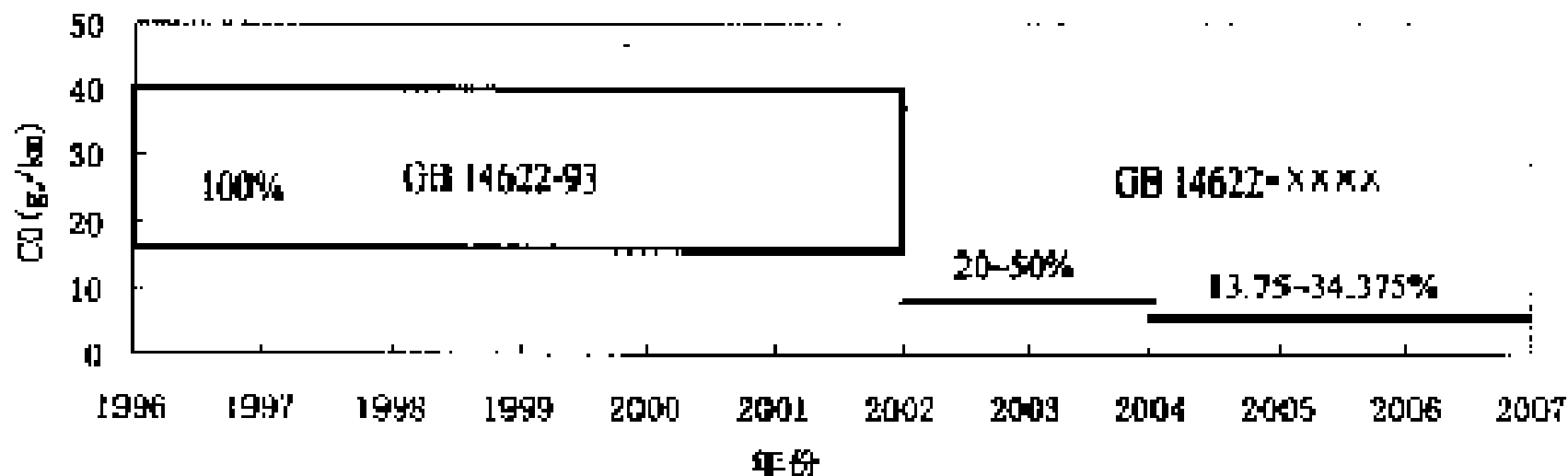
2.2.3 Proposed Idle Emission Standards for motorcycles and mopeds

	CO (%)	HC (C ₆ H ₁₄) (ppm)	
		4-T	2-T
Type approval vehicle from 01,01,2002	3.8	800	3500
New produced vehicle from 01,01,2002	4.0	1000	4000
Used vehicle manufactured after 01,01,2002	4.5	1200	4500
Used vehicle manufactured before 01,01,2002	4.5	2200	8000

2.2.4 Durability requirement will be
6,000 km

2-T Emission Limits

二冲程摩托车CO排放限值

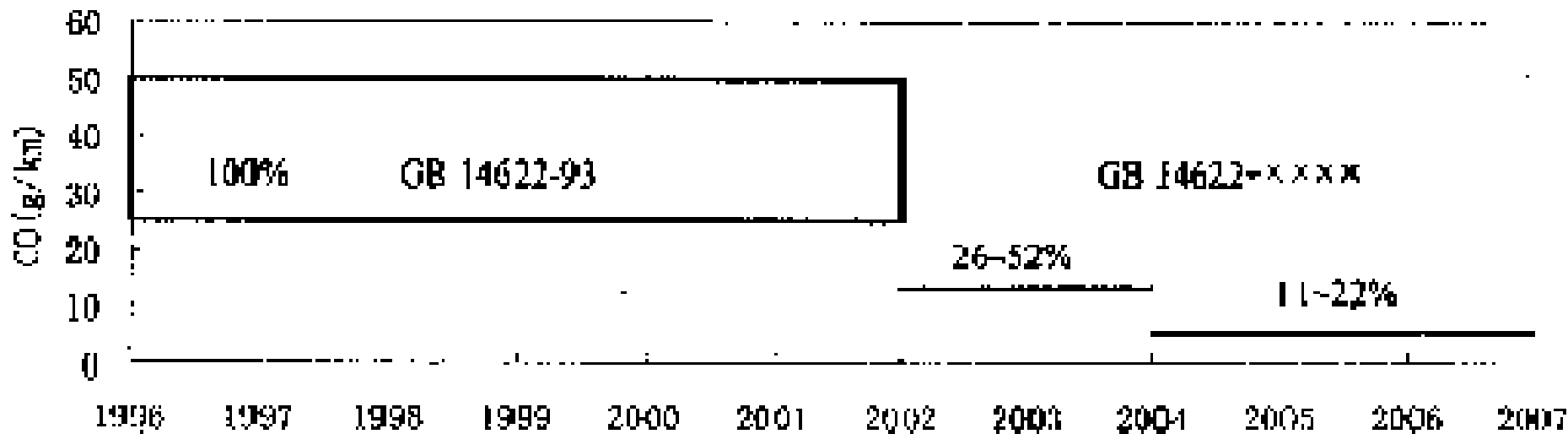


二冲程摩托车HC排放限值

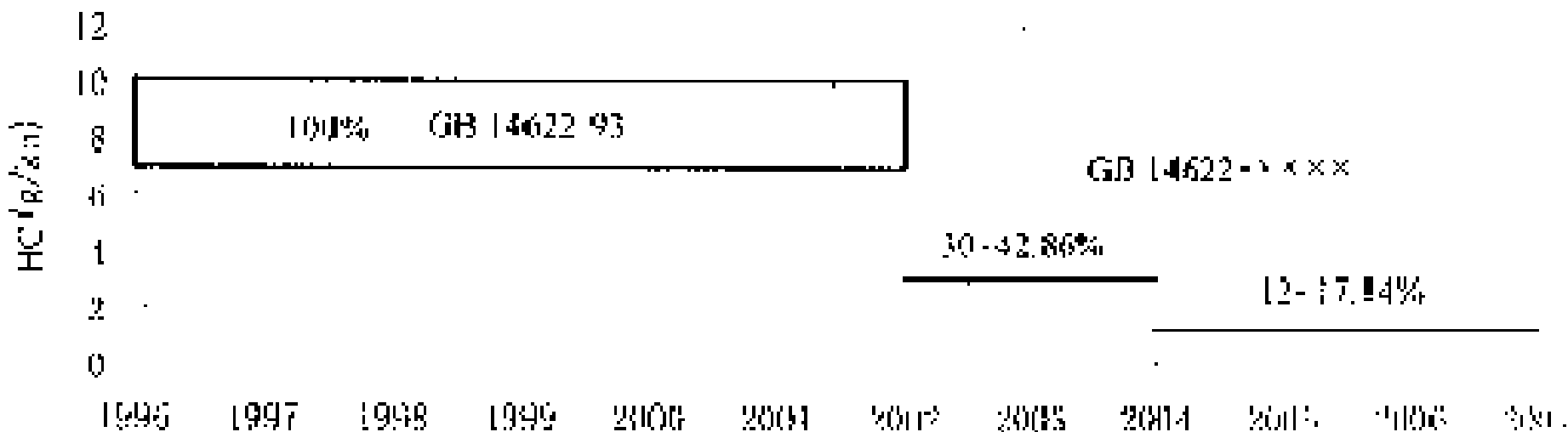


4-T Emission Limits

四冲程摩托车CO排放限值

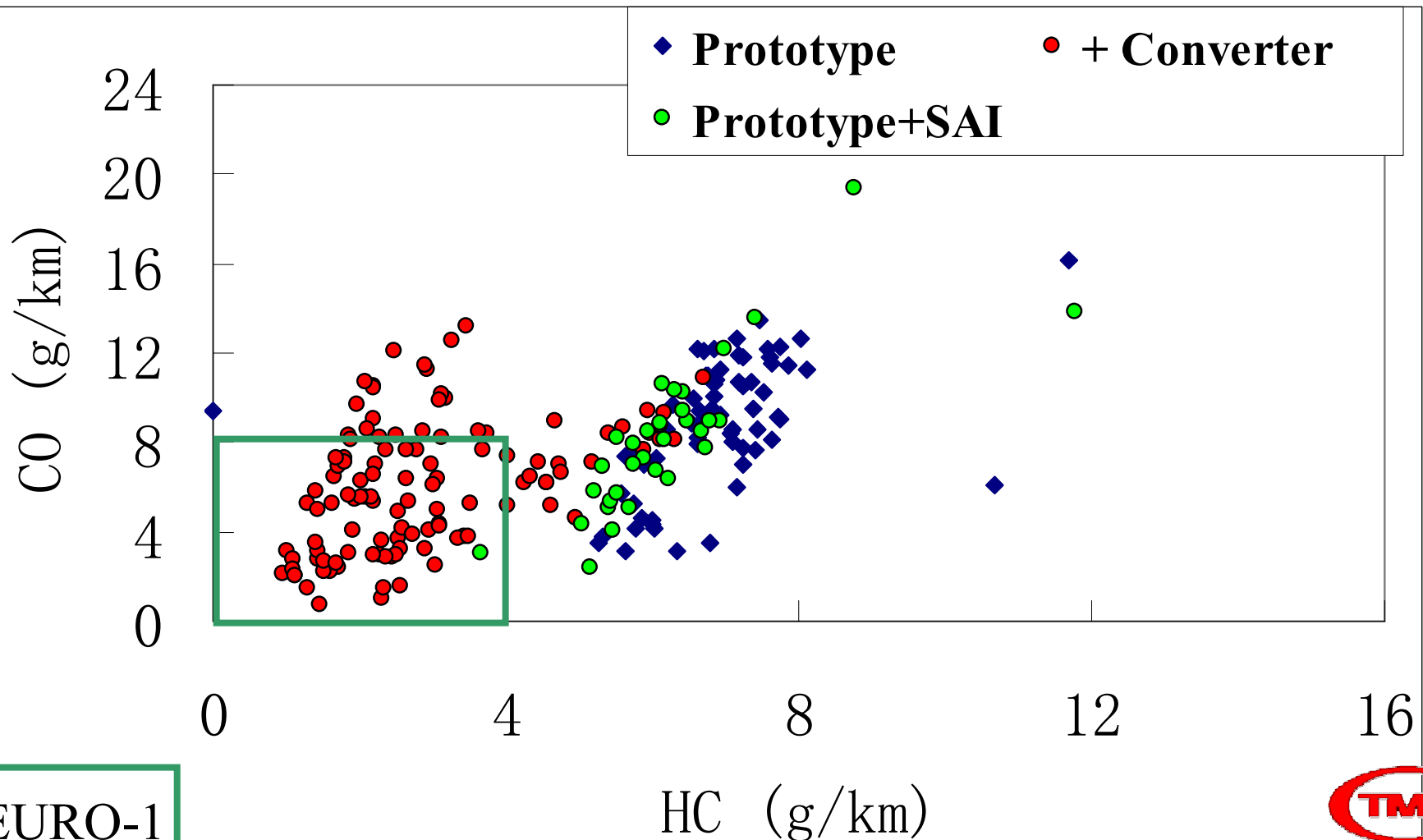


四冲程摩托车HC排放限值

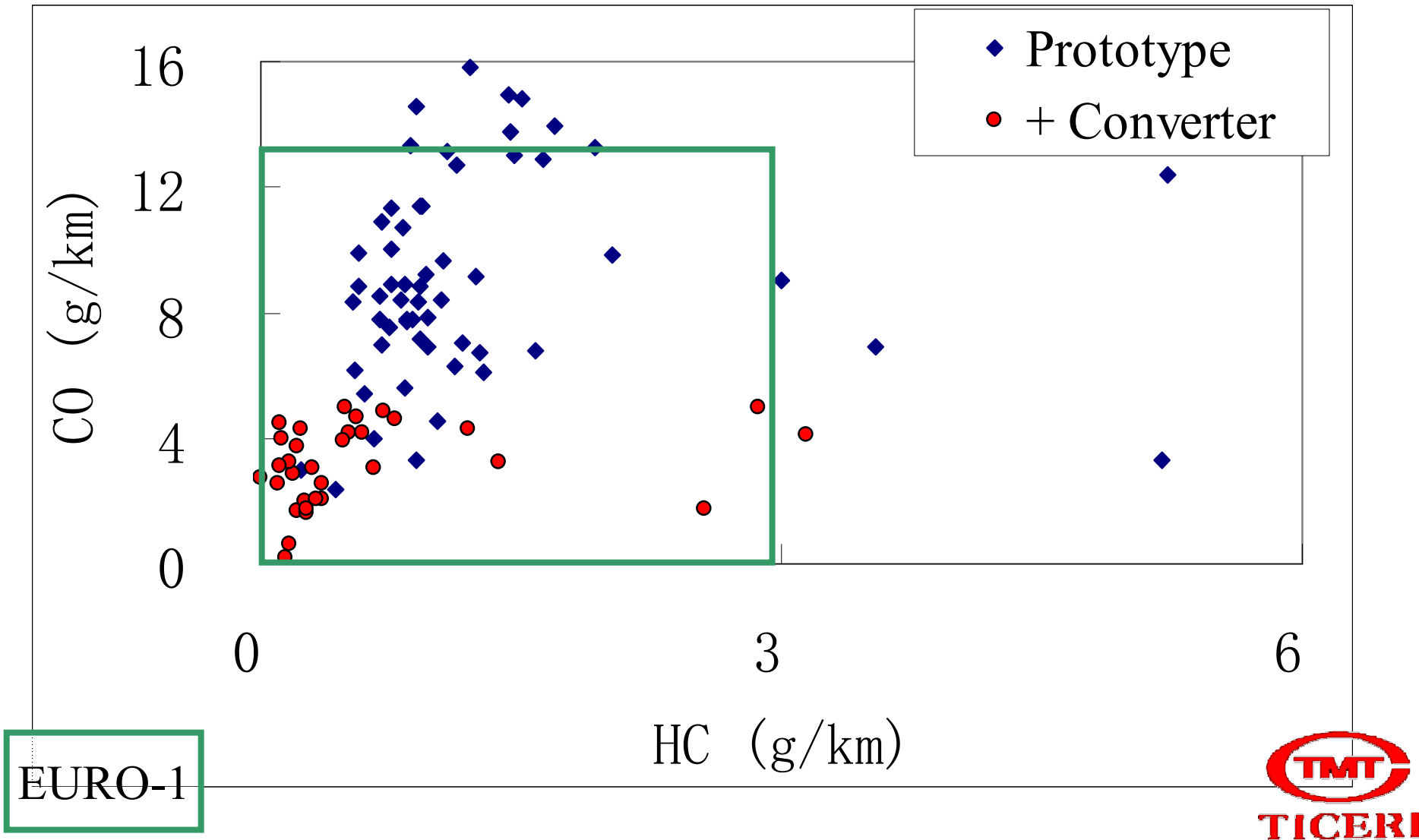


3. Application of Catalytic converters for motorcycles in China

3.1 Statistic of Chinese 2-T motorcycle emission with and without converter



3.2 Statistic of Chinese 4-T motorcycle emission with and without converter



3.3 Chinese gasoline standard and test data

	Standard	Sample-1	Sample-2
Lead (g/L)	0.005	0.001	0.0025
S (%)	0.1	0.03	0.018

4. Application of fuel injection systems for motorcycles in China

- Mostly Chinese motorcycle manufacturers are taking a great interest in fuel injection system.
- Research work has been done by many overseas and Chinese fuel injection system suppliers.
- The cost and reliability problems still need to be further improved.

5. Conclusions

- Chinese motorcycle industry has being developed rapidly.
- Chinese government control motorcycle emissions by means of tighten regulations which were followed European system.
- Catalytic converters likely become practical technical countermeasure in the near future.
- Fuel injection system will be used accompanied with catalytic converter to meet future stricter emission regulations.

Thank you!