Vehicle Fuel Economy Standard: Case Study of Thailand

Fifth Regional EST Forum in Asia

24 August 2010

Royal Orchid Sheraton Hotel & Towers

Bangkok, THAILAND

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Elements of a Comprehensive Vehicle Pollution Control Strategy

Better Air Quality

Clean Vehicle Technologies

Clean Fuels

Transport & Land use Planning

Appropriate Maintenance

Clean Vehicle Technologies

1. Emission Standard;
   - For New Vehicle
   - For In-use Vehicle.
2. Inspection and Maintenance Program
3. Environmental Friendly Vehicle Program

Emission Standard for New Vehicle

Gasoline Vehicle

Current Standard: EURO III

Maximum Mass ≤2.5 tons				2.5 tons < Maximum Mass ≤ 3.5 tons				
CO (g/km)	HC (g/km)	HC+NOx (g/km)	NOx (g/km)	RW (kg)	CO (g/km)	HC (g/km)	HC+NOx (g/km)	NOx (g/km)
2.3	0.2	-	0.15	≤1305	2.30	0.20	0.15	-
				1305<R ≤1760	4.17	0.25	0.18	-
				≥1760	5.22	0.29	0.21	-

Future Standard: EURI IV in year 2012

Light Duty Diesel Vehicle

Current Standard: EURO III

Maximum Mass ≤2.5 tons					2.5 tons < Maximum Mass ≤ 3.5 tons					
CO (g/km)	HC (g/km)	HC+NOx (g/km)	NOx (g/km)	PM (g/km)	RW (kg)	CO (g/km)	HC (g/km)	HC+NOx (g/km)	NOx (g/km)	PM (g/km)
0.6	-	0.56	0.5	0.05	≤1305	2.30	0.2	0.15	-	0.05
					1305<R ≤1760	4.17	0.25	0.18	-	0.07
					≥1760	5.22	0.29	0.21	-	0.1

Future Standard: EURI IV in year 2012

Emission Standard for New Vehicle

Heavy Duty Diesel Vehicle

Current Standard: EURO III

Driving Cycle	HC (g/kWh)	NMHC (g/kWh)	CH_4 (g/kWh)	NOx (g/kWh)	CO (g/kWh)	PM (g/kWh)	Smoke (m^{-1})
ESC & ELR Test	0.66	-	-	5.0	2.1	0.10	0.8
ETC Test	-	0.78	1.6	5.0	5.45	0.16	-

Motorcycle

Current Standard: EURO III

	CO (g/km)	HC (g/km)	NOx (g/km)	White Smoke (%)	Evaporative (g/test)
Size<150 cc.	2.0	0.8	0.15	15	2.0
Size≥150 cc.	2.0	0.3	0.15	15	(2>Evap≤6)

Emission Standard for In-use Vehicle

Diesel Vehicle

Pollutant	Standard	Measuring Device	Test Procedure
Black Smoke	50%	Filter	Snap acceleration on test
	45%	Opacity	
	40%	Filter	Full load test
	35%	Opacity	

Emission Standard for In-use Vehicle

Gasoline Vehicle

	CO (%)	HC (ppm)	Measuring Device	Test Procedure
Gasoline vehicle registered before Nov. 1,1993	4.5	600	NDIR	Idle Test
Gasoline vehicle registered from Nov. 1,1993	1.5	200		
Gasoline vehicle registered from Jan. 1,2007	0.5	100		

Emission Standard for In-use Vehicle

Motorcycle

	CO (%)	HC (ppm)	White Smoke (%)
Registered before Jul 1, 2006	4.5	10,000	30
Registered from Jul 1, 2006	3.5	2,000	30
Registered from Jan 1, 2010	2.5	1,000	30

Tuk Tuk (3 wheelers)

CO (%)	HC (ppm)	White Smoke (%)
4.5	10,000	30

Inspection and Maintenance Program

- **Improvement test method in order to represent the real emission from each vehicle.**
- **Decrease the life of vehicle which have to inspection for the first time.**

Current

- **Motorcycle: *5 year***
- **Gasoline and Diesel Vehicle: *7 year***
- ***Taxi*: *2-3 times/year***
- **Bus: *2 times/year***
- **Truck: *1 time/year***

Environmental Friendly Vehicle Program

Promoting environmental friendly initiatives to increase capability in prevention and reduction of air pollution and greenhouse gas such as

- **ECO Car**
- **High fuel efficient Vehicle**
- **Green Vehicle**

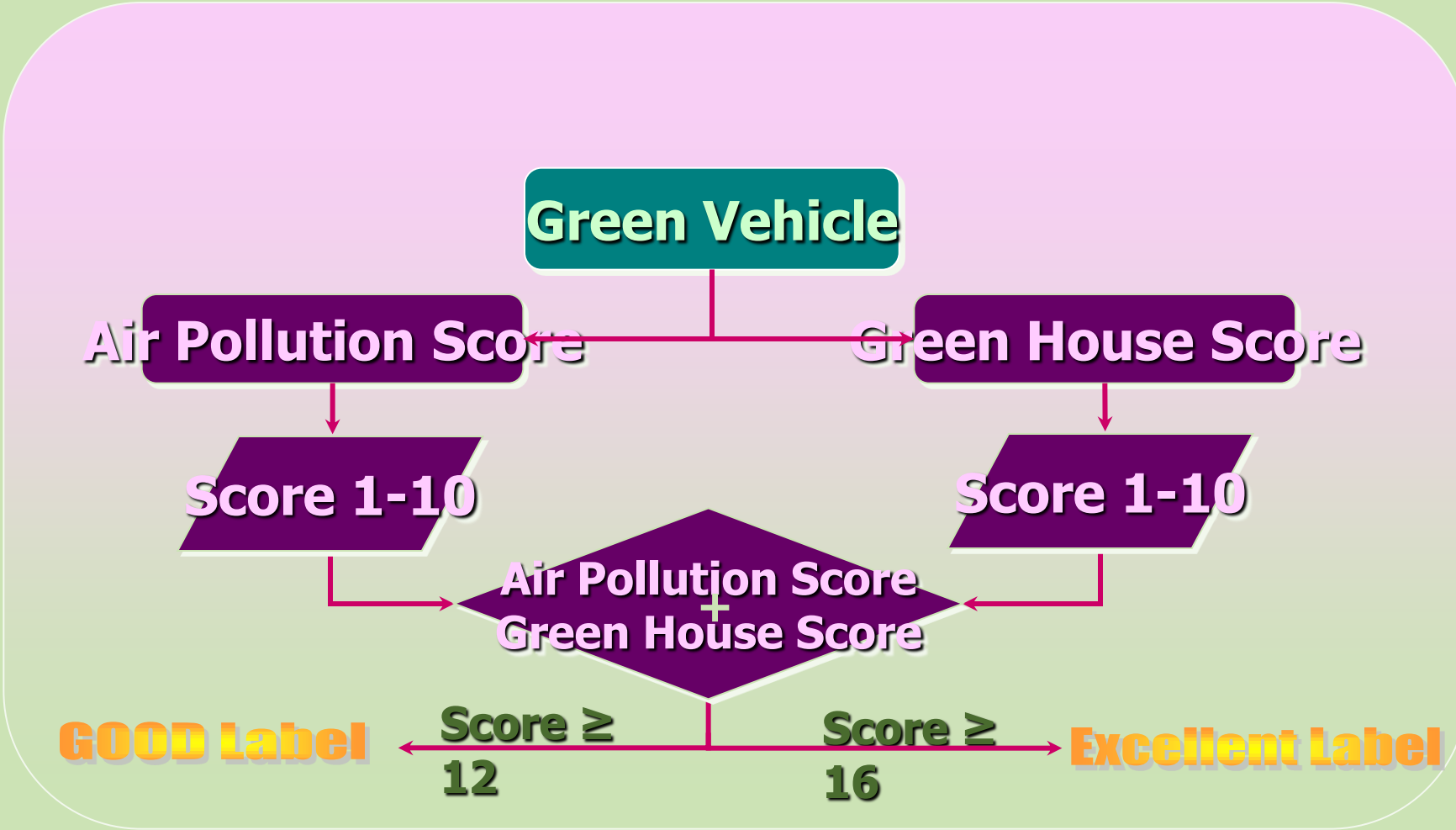
ECO Car

- *Clean*: meet EURO 4 standard (Directive 98/69/EC) and CO_2 not exceed 120 g/km
- *Economical*: Fuel economy 5.0 L/100 km
- *Safety*: meet ECE-R 95 Rear-end collision and ECE-R 94 head-on collision

High fuel efficient Vehicle

Vehicle Mass (kg)		Fuel Consumption (km/L)	
>	≤	Gasoline Vehicle	Diesel Vehicle
0	610	12.5	16.9
610	750	11.2	15.0
750	865	10.5	14.0
865	980	10.0	13.2
980	1090	9.5	12.5
1090	1205	9.0	11.8
1205	1320	8.5	11.1
1320	1430	8.1	10.5
1430	1540	7.7	10.3
1540	1660	7.3	9.4
1660	1770	6.9	8.9
1770	1880	6.6	8.3
1880	2000	6.3	8.1
2000	2110	6.0	7.9
2110	2280	5.7	7.5
2280	2510	5.3	7.2
2510	3500	4.6	7.2

Green Vehicle



Pollution Score for Gasoline Vehicle

score	Fuel	Reference STD.
10	Electric	-
9	Gasoline, Gasohol, CNG, LPG, and Hybrid	EURO 5,6 (-15%)
8	Gasoline, Gasohol, CNG, LPG, and Hybrid	EURO 5,6 (-10%)
7	Gasoline, Gasohol, CNG, LPG, and Hybrid	EURO 5,6 (-5%)
6	Gasoline, Gasohol, CNG, LPG, and Hybrid	EURO 5,6
5	Gasoline, Gasohol, CNG, LPG, and Hybrid	EURO 4 (-20%)
4	Gasoline, Gasohol, CNG, LPG, and Hybrid	EURO 4 (-15%)
3	Gasoline, Gasohol, CNG, LPG, and Hybrid	EURO 4 (-10%)
2	Gasoline, Gasohol, CNG, LPG, and Hybrid	EURO 4 (-5%)
1	Gasoline, Gasohol, CNG, LPG, and Hybrid	EURO 4

Pollution Score for Diesel Vehicle

score	Fuel	Reference STD.
10	Electric	-
9	Diesel, Bio-diesel, and Hybrid	EURO 6
8	Diesel, Bio-diesel, and Hybrid	EURO 5 (-25%)
7	Diesel, Bio-diesel, and Hybrid	EURO 5
6	Diesel, Bio-diesel, and Hybrid	EURO 4 (-60%)
5	Diesel, Bio-diesel, and Hybrid	EURO 4 (-40%)
4	Diesel, Bio-diesel, and Hybrid	EURO 4 (-20%)
3	Diesel, Bio-diesel, and Hybrid	EURO 4 (-10%)
2	Diesel, Bio-diesel, and Hybrid	EURO 4 (-5%)
1	Diesel, Bio-diesel, and Hybrid	EURO 4

CO_2 Score for Gasoline Vehicle

Vehicle Mass (kg)		CO_2 Score (g/km)									
>	≤	10	9 (-70%)	8 (-60%)	7 (-50%)	6 (-40%)	5 (-30%)	4 (-20%)	3 (-10%)	2 (-5%)	1
	610	< 56	56-73	74-92	93-111	112-129	130-148	149-166	167-176	177-185	≥186
610	750	< 62	62-82	83-103	104-124	125-144	145-165	166-186	187-196	197-207	≥ 208
750	865	< 66	66-88	89-110	111-132	133-154	155-176	177-198	199-209	210-220	≥ 221
865	980	< 70	70-92	93-115	116-139	140-162	163-185	186-208	209-220	221-232	≥ 223
980	1,090	< 73	73-97	98-121	122-146	147-170	171-195	196-219	220-232	233-244	≥ 245
1,090	1,205	< 78	78-102	103-128	129-154	155-180	181-206	207-232	233-244	245-257	≥ 258
1,205	1,320	< 82	82-108	109-136	137-163	164-190	191-218	219-245	246-259	260-273	≥ 274
1,320	1,430	< 86	86-114	115-143	144-171	172-200	201-229	230-257	258-272	273-286	≥ 287
1,430	1,540	< 91	91-120	121-150	151-180	181-210	211-241	242-271	272-286	287-301	≥ 302
1,540	1,660	< 96	96-126	127-158	159-190	191-222	223-254	255-286	287-302	303-317	≥ 318
1,660	1,770	< 101	101-	135-	168-	202-	236-	270-	303-	320-	≥ 337

CO_2 Score for Diesel Vehicle

Vehicle Mass (kg)		CO_2 Score (g/km)									
>	≤	10	9 (-60%)	8 (-50%)	7 (-40%)	6 (-30%)	5 (-20%)	4 (-15%)	3 (-10%)	2 (-5%)	1
	610	< 55	55-68	69-82	83-95	96-109	110-116	117-123	124-130	131-137	≥ 138
610	750	< 62	62-77	78-92	93-108	109-123	124-131	132-139	140-146	147-154	≥ 155
750	865	< 66	66-82	83-99	100-115	116-132	133-140	141-148	149-157	158-165	≥ 166
865	980	< 70	70-87	88-105	106-122	123-140	141-149	150-158	159-166	167-175	≥ 176
980	1,090	< 74	74-92	93-111	112-129	130-148	149-157	158-166	167-176	177-185	≥ 186
1,090	1,205	< 79	79-98	99-117	118-137	138-157	158-166	167-176	177-186	187-196	≥ 197
1,205	1,320	< 84	84-104	105-125	126-146	147-167	168-177	178-188	189-198	199-208	≥ 209
1,320	1,430	< 89	89-110	111-132	133-154	155-176	177-187	188-198	199-209	210-220	≥ 221
1,430	1,540	< 90	90-112	113-134	135-157	158-180	181-191	192-202	203-213	214-225	≥ 226
1,540	1,660	< 99	99-123	124-147	148-172	173-197	198-209	210-222	223-234	235-246	≥ 247
1,660	1,770	< 104	104-	131-	157-	183-	209-	222-	235-	248-	≥ 261

Clean Fuels

- **Improving fuel quality**
  - **Thailand plan to enforce EURO IV in year 2012**
    - ✓ **sulfur content both in diesel and gasoline will be reduce to 50 ppm.**
    - ✓ **Benzene content in gasoline will be reduce to 1% from 3.5%**
- **Promoting the use of alternative fuel**
  - **Ethanol fuel**
    - ✓ **Gasohol E10**
    - ✓ **Gasohol E20**
    - ✓ **E85**
  - **Bio-diesel**
    - ✓ **Diesel B3**
    - ✓ **Bio diesel B5**
  - **CNG**

Thanks for your Attention