The Singapore case

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Primary objective: Congestion reduction

Positive side effects: Pollution control
Revenue creation

Elements

- Area Licensing Scheme (ALS)
- Electronic Road Pricing (ERP) commencing 1998
- Vehicle Quota System
- Annual Road Tax
- Park & Ride scheme
- bus improvement & priority
- mass rapid transit system
- traffic management measures

Use of EI

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Economic measures

Annual road taxes

Differentiated according to:

- engine capacity
- fuel type
- type of vehicle (car, motorcycle)

Electronic road pricing (1998-)

Differentiated according to:

- time of day
- traffic zones
- type of vehicle

Vehicle quota system (1990-)

Certificates of Entitlement (COE) depend on

- growth of vehicle fleet vs. capacity
- willingness to pay (auctioning of COEs)

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Road Tax Charges for Motor Cars (Per Annum)

Engine Capacity (EC)	Road Tax Formula (Singapore $)
< 600 cc	$500 (flat rate)
600 cc - 1,000 cc	$500 + 0.25 x (EC - 600)
1,000 cc - 1,600 cc	$600 + 1.0 x (EC - 1,000)
1,600 cc - 3,000 cc	$1,200 + 1.8 x (EC - 1,600)
> 3,000 cc	$3,720 + 2.5 x (EC - 3,000)

Diesel Tax: 6 times the amount of computed road tax for a vehicle of the same engine capacity

Example 1 (1000cc): Tax = $500 + 0.25 x (1000 - 600) = $600

Example 2 (4000cc): Tax = 3720 + 2.5 x (4000 - 3000) = $6220

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Electronic road pricing rates (passenger cars) (May 2000)

Time	ECP	CTE	PIE	Restricted Zone		
	Monday - Friday	Monday - Friday	Monday - Friday	Monday - Friday		Saturday
7.30 - 8.00am	$0.50	$1.00	$1.00	$0.50	$1.00 Nicoll Highway	
8.00 - 8.30am	$1.00	$2.50	$1.50	$2.00	$2.50 Nicoll Highway	
8.30 - 9.00am	$2.00	$2.50	$1.00	$2.50		$0.00
9.00 - 9.30am	$0.50	$0.50	$0.50	$2.00		$0.00
9.30 - 1.00pm				$1.00		$0.00
1.00 - 5.30pm				$1.00		
5.30 - 6.00pm				$1.50		
6.00 - 6.30pm				2.00		
6.30 - 7.00pm				$1.00		

different zones

Rush-hours are more expensive

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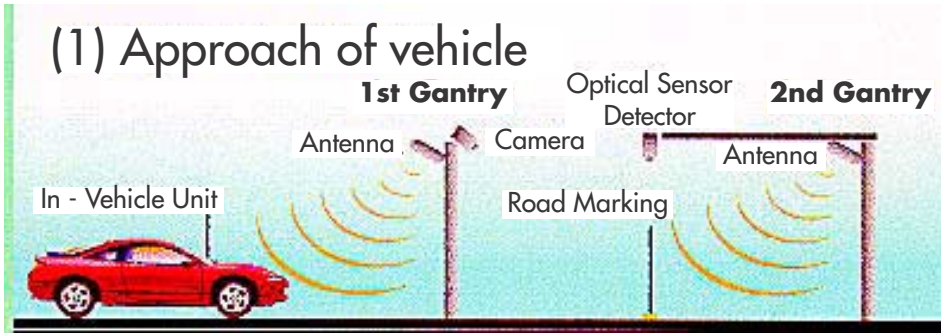
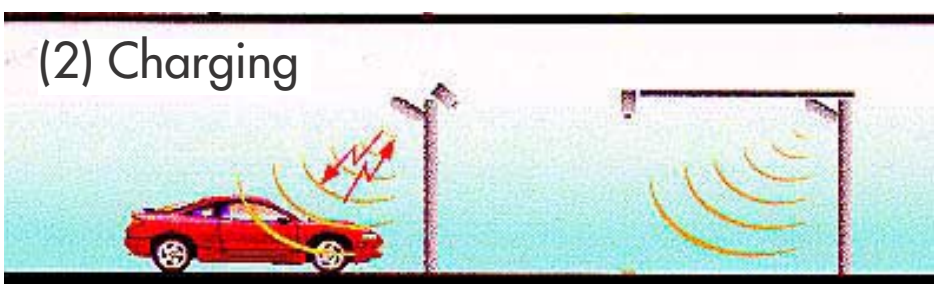
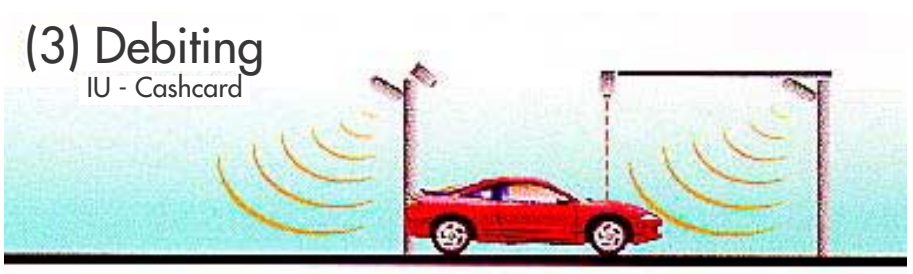
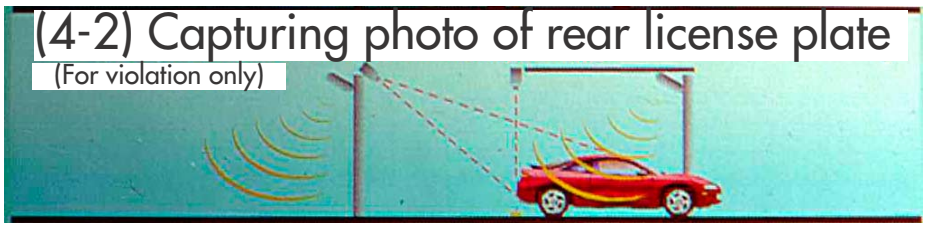
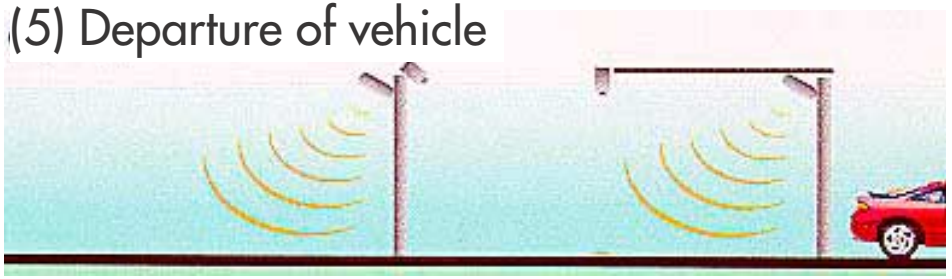
How does the ERP system work?











Source: http://www.lta.gov.sg, 2 May 2000

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How are Certificates of Entitlement (COE) allocated?

The quote charge from month to month if quotas are not taken up

Month	Quota Cars < 1000cc	Quota Cars 1001-1600cc	Quota Cars 1601-2000 cc
August 1997	195	1118	336
January 1998	195	1118	336
February 1998	196	1129	358
March 1998	195	115	336
April 1998	195	1133	380
June 1998	164	1205	329
April 2000	2153		555 (includes >2000cc)

People bid under a specific category. If the quote is 195 then the top 195 bids are successful and pay the Quota Premium; is the price offered by the 195th bid.

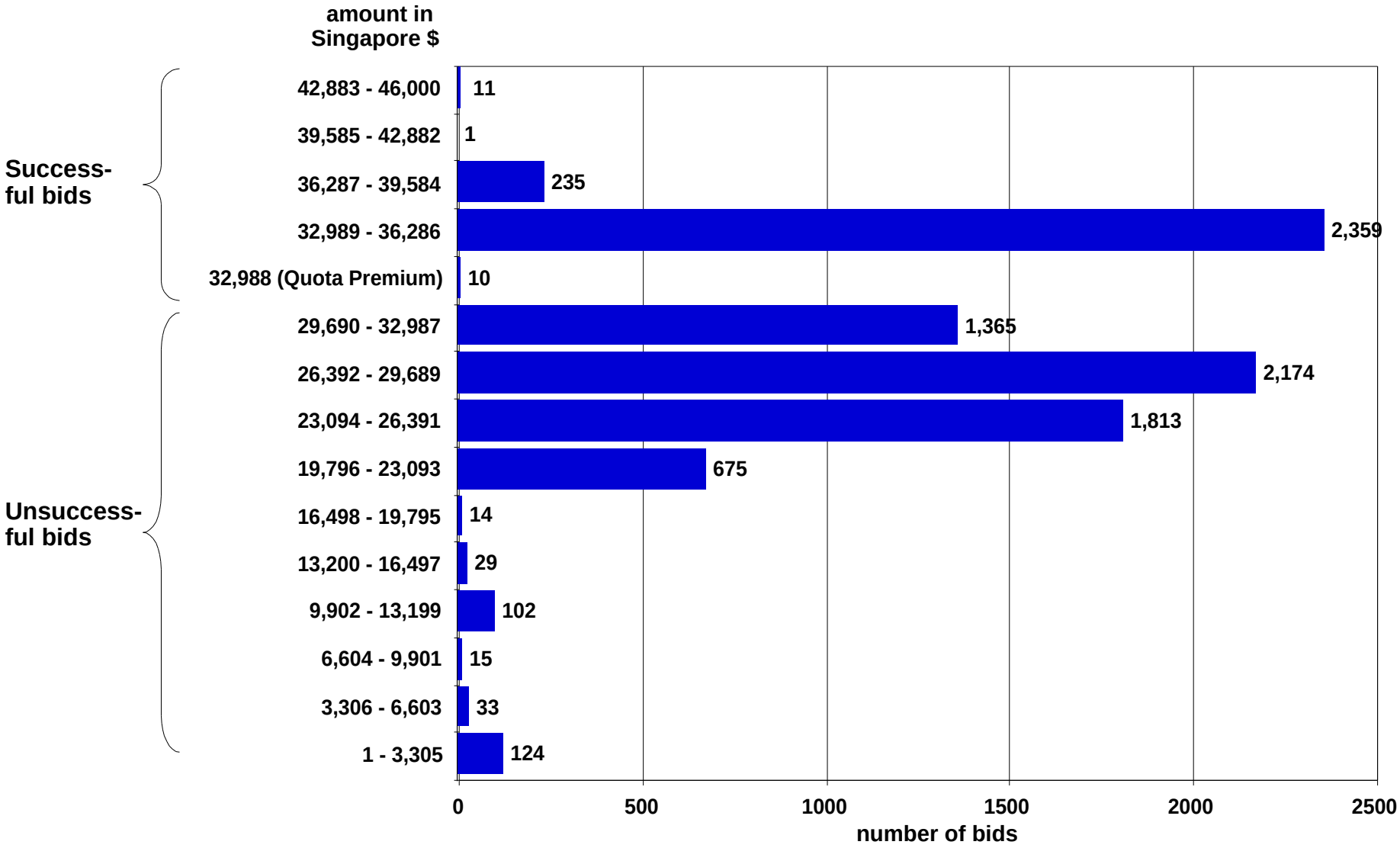
In early 1999 the average premium for cars < 1000cc was S$27,367; for cars 1001 - 1600cc S$32,610 and for big cars (1601 - 2000cc) S$30,566

The Singapore Certificate of Entitlement: Tendering results for March 2001 COE

	Category A Cars < 1600cc	Category B Cars > 1600cc	Category C Goods Vehicles, Buses	Category D Motorcycles
Quota	2,617	1,167	1,964	1,099
Quota Premium*	$32,988	$31,500	$13,610	$706
Total Bids Received	8,960	4,745	4,503	1,292
As % of quota	342%	406%	229%	117%
Successful	2,614	1,159	1,964	1,080
Unsuccessful / Disqualified	6,346	3,586	2,539	212
Highest Bid *	$46,000	$48,000	$28,000	$8,800
Lowest Bid *	$1	$1	$1	$20
Unused Quota carried forward	3	8	0	19

*** Prices in Singapore$: 1 Singapore$ = 0.57 US$**

The Singapore Certificate of Entitlement: Distribution of bids for Category A* (March 2001)



*** Category A certificate: Passenger Cars < 1600cc**

Singapore: Results

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Fairness

- pricing structure that is time and congestion sensitive
- charge on a per-trip basis; shift: ownership toward use-based charges

Convenience for users and regulators

- automation, electronic payment, information provision

Reliability and effectiveness

- automation, traffic control and optimization
- COEs limit number of cars/amount of pollution

Strong impact/goals reached

- modal split changed: public transport share rose from 46% in 1974 to over 60% today
- rising revenues, progressive extension to congested roads

Singapore: lessons learned

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At least:

1 ***Only policy mix successful:***

- EI combined with strong improvement of public transport quality
- Strengthening public transport capacity

2 ***Win-win solutions achievable***

- environmental objectives and revenue goals are compatible
- improvement of urban living conditions goes parallel with satisfying demand for mobility

Trondheim (Norway)

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Road pricing: toll ring of Trondheim – main factors

Objectives:
revenue raising;
traffic/congestion reduction;
urban air quality

- **Fee for cars entering city centre**
- **Differentiated rate structure**

Local conditions:
pop. 140,000;
0.5 cars/inhabitant;
many small streets

Social concerns:
frequent users, etc.

Trondheim's toll ring

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Elements of the strategy

1. 17 electronic toll stations:
   register traffic on access roads
   electronic payment lanes to avoid queues
2. Differentiated tolls
3. Cars equipped with electronic tag
4. Limited duration of the system (1991-2006)
5. Contracting-out of toll stations
6. Revenues earmarked for transport investment
7. Additional funding for road building, public transport, safety and environmental projects

Rate structure

- pay only once per hour on entry
- basic toll level 1.5 Euro
- heavy cars (> 3.5 t) pay double
- maximum fee per month: 60 payments (90 or 180 Euro)
- free entry after 6 pm on workdays
- free entry at the weekends

Trondheim: results

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Greater road use efficiency

Changes in transport mode (from car to bicycle and walking), traffic reduction during rush hour, traffic increase on evenings and weekends, fewer congestions

Better environmental performance

Less pollution

Rise in "living conditions"

Fewer waiting hours for public transport or in congestion, fewer delays in transport of goods, large public agreement for system

Revenue creation

Trondheim: lessons learned

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Importance of public support for success of measure

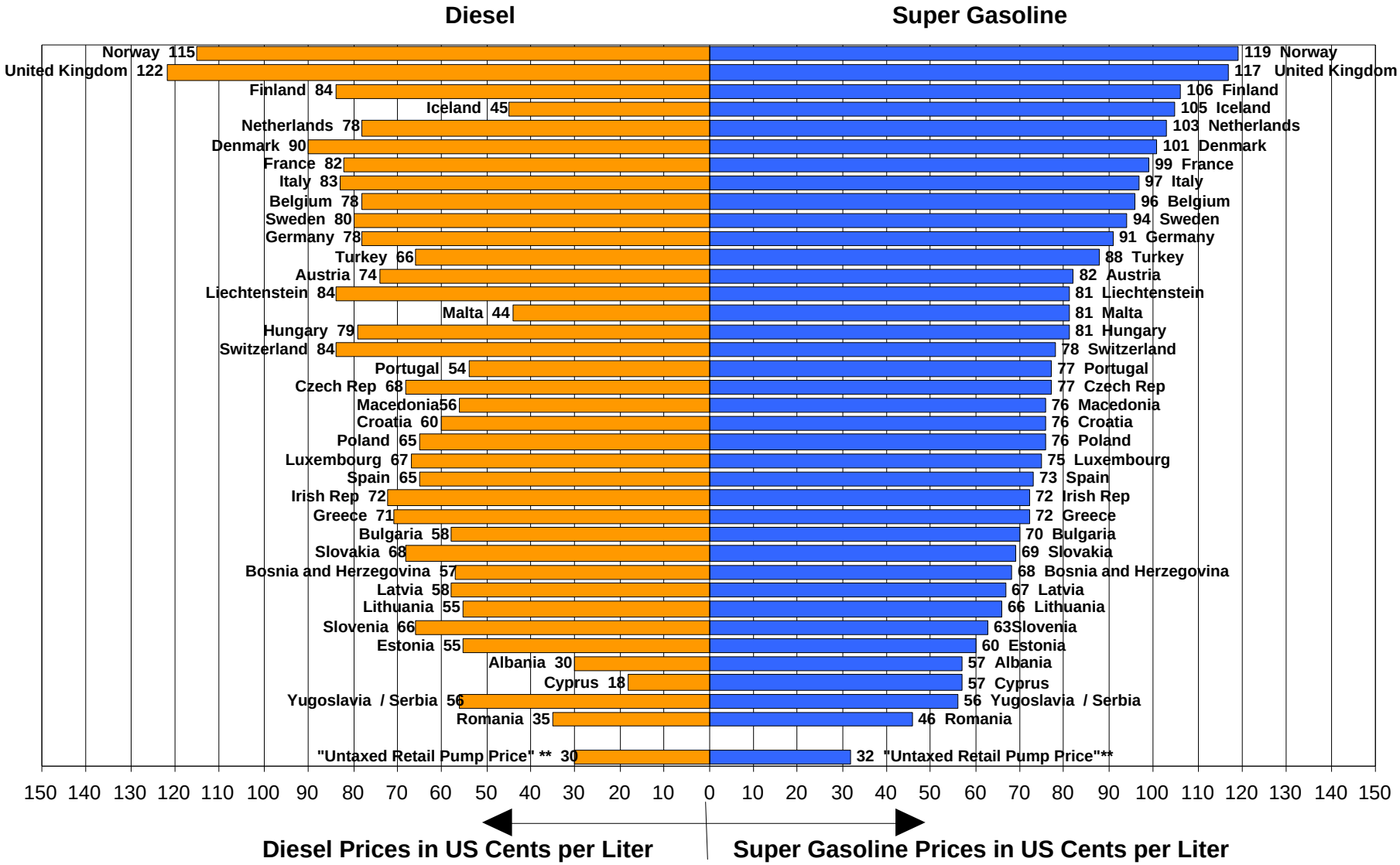
- Achieved through public awareness campaigns
- social and business concerns matter (traffic reduction for "environmentalists", transport capacity strengthened for "motorists")

Contracting out/privatization helpful

Only a policy mix will be successful

- Toll combined with strong support for public transport

Fuel prices in Europe as of November 2000



Source: GTZ Fuel Price Survey 2000 (Dr. Metschies); 1 US$ = 2,26 DM = 1,16 Euro

* The gasoline quality is in general "Super". In those countries marked with " * " the quality is "Regular".
** The "Average Untaxed Retail Pump Price" is a hypothetical reference retail price including distribution and VAT but excluding fuel tax.