



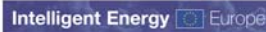
Ecodriving

the cool, safe and cleanest driving style for saving fuel
principles and practise

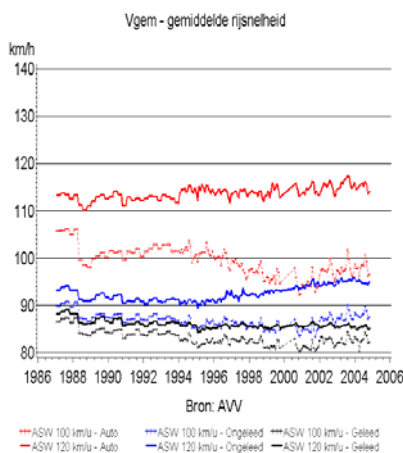
IEA Workshop "Cooling cars with less fuel", Paris, Oct. 23-24, 2006

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Ministry of the Environment [VROM], The Netherlands
1986 - 2005



Driver behaviour and environmental policies in NL 1986 - 2006



1) Highway speed limits 120/100/80 km/hr since 88
Strict **highway speed limit enforcement** [up to 2M fines/yr!] + tactics + communication + HDV speed retarders: drop in real speeds since 88;

Speed limits part of env. policies and effective:
V50=109 km/hr = 2%- 4% CO2/NOx traffic emissions reduction [or 5% -10% ref. BRD]

2) Ecodriving part of TRANS/ENV policies since 88; program R&D in-car and networking, today

"HNR" program part of NL Kyoto implementation & budget: nr.1 cost-effectiveness: <10 euro/ton CO2!



Vehicles and driver behaviour trends

VEHICLE TRENDS: the car-industrial-cultural complex

Constant upgrading in dimensions, weight, power and speed / performance [from 30/40 hp 2CV/Mini >150/300 hp TDI/SUV]

Average new car: 1700 cc, >100 hp, 200 km/hr, 1250 kg [NL]

Engine man. >>low pollution and f.c. in EU test cycle> *shortfall*

DRIVER BEHAVIOUR TRENDS = driver<>vehicle interaction

Too dynamic driving style dominant [high RPM/acceler./speed]

Aggression, fun, self expression, risk compensation [*"Top Gear"*!]

Speed and vehicle dynamics major risk/pollution/energy factors

More driver self-restraint needed than ever before

Climate Change Policy Trends [road traffic]: Veh. tech / alt. fuels overestimated, "soft" measures/behaviour promising = no regret



What is ecodriving?! The principles

Preferably "in *Top Gear*", but not the Jeremy Clarkson way!!

Best practise in WW2, Suez crisis, 1973 and in car manuals

Today: Oil Shock but Boiling Frog!

Rule 1: individual benefits = community benefits

f.e./ CO2 system effects = total of individual f.e. effects

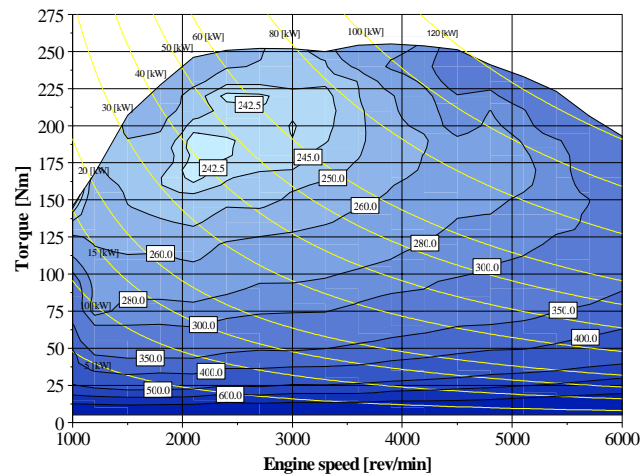
Rule 2: **CAPACITY**: using modern engine/transmission capacities, in-car/simulator training/behavioral change

Rule 3: **OPPORTUNITY**: avoiding inefficiencies in all driving actions [all trips, all vehicle types, all kms]

Rule 4: **ACCEPTABILITY**: rationality & safety first, awareness and consciousness, communication & networking



Specific power/fuel efficiency engine speed map [turbocharged-petrol] source: TNO Automotive



Ecodriving fuel /CO₂/damage reduction potentials, the practise

Ecodriving advanced training

- ↑ Up to 25% individual fuel savings potential
- ↑ 5-10% fuel savings in fleet owner practice
- ↑ Up to 40% less accidents, less stress/aggression

Ecodriving.... HOW?

Less engine speed: gear change at 2000 – 2500 RPM [cars, LDV]

Less vehicle dynamics (acceleration/ deceleration/ speeding/ overtaking/ aggression: anticipation)

less idling & cold start short trips, tyre pressure +10%

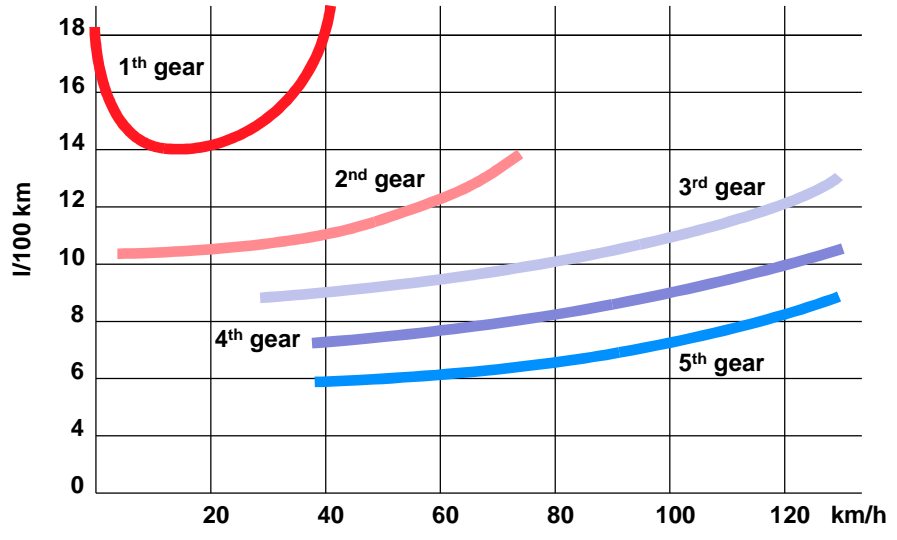
CAPACITY >> Training, communication, in-car devices (on-board computer, cruise control, RPM, MDD, GSI)

ECCP: EU 15 reduction estimates:

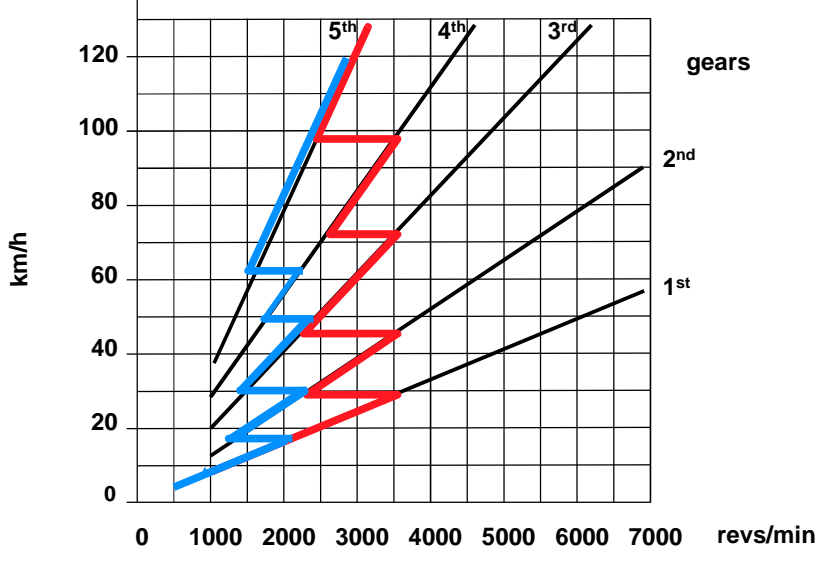
10% fuel costs = 25 billion litres /Euro = >50 Mton CO₂



Fuel economy in gears [petrol 1,8 l.]



Gear change pattern: ecodriving vs. the old way





How Gear Shifting Affects Fuel Consumption

Seat Ibiza 1,4 l. 55 kW at 50 km/hr:

in 2nd gear = 3600 RPM = 8 km/l

in 3rd gear = 2600 RPM = 12 km/l

in 4th gear = 1900 RPM = 17 km/l

in 5th gear = 1400 RPM = 21 km/l



In-car instruments & driver behaviour support

1. Econometer/vacuum meter [petrol only]
2. On-board computer/fuel consumption meter
3. Cruise-control [incl. adaptive c.c.]
4. Modern Drive Device/ Gear Shift Indicator
5. RPM meter, with green band 1200 – 3000 RPM
6. Vehicle speed retarder
7. Engine speed retarder
8. Electronic accelerator, throttle pressure control
9. Lambda=1 full load engine management
10. Adaptive low RPM automatic gearbox
11. Satellite navigation

In-car driver feedback/support devices



Feedback unit

Training activities





Ecodriving tips

"You can save 10% - 25% fuel today when you:"

1. Keep engine speeds between 1200 – 3000 RPM
- 1) Change gears (up) at 2000 – 2500 RPM
- 2) Avoid strong accelerations, full throttle and long idling
- 3) Use your RPM meter / board computer / cruise control
- 4) Live up to (highway) speed limits or max.120 km/hr
- 5) Add 10% to standard tyre pressure & check it!
- 6) Less use of airco [= >10% f.c.] or set >21° C
- 7) Use your bike for short trips [cold start = <300% f.c.]



Ecodriving programme implementation NL

- Ecodriving needs programming and networking
- Ecodriving part of CO₂, noise & air quality policies
- Ecodriving part of road safety & licensing policies
- **PARTNERS:** business organisations and institutions [car business, HDV transport, fuels, driver training, insurance, car lobby, media, lease/fleet owners, local govts., NGO's, road safety lobby, consumer org.]
- NL priorities:
 - Training of professional drivers [national, corporate]
 - Driving schools and training the trainers [national, EU]
 - Awareness raising and mass media communication [id.]
 - In-car: board computer no.1 priority [EU + car industry]
 - Tyre pressure +10% [EU/ACEA, FIA]



Ecodriving programmes and links

- EU: TREATISE; TRAINER; ECODRIVEN
- Many Member-States: national programs
- Asia [China!] and CEE too

- www.hetnieuwerijden.nl
- www.ecodrive.org
- www.treatise.eu.com

- Email: p.wilbers@senternovem.nl; mc.kroon@hetnet.nl



RECOMMENDATIONS FOR THE IEA, THE EU, THE G8...

Saving fuel and improving driver behaviour are low-cost or no regret options with best societal benefits:

- 1) Strict highway speed limits enforcement
- 2) No speed limits above 130km/h (D, I !)
- 3) Implementation of Eco-driving in driver education and other policies (env., transport, energy)
- 4) In-car driver support compulsory in new cars (NOW!) by agreement or regulation
- 5) RPM-meter + eco-zone : all new cars.
-on-board computer + actual F.C.: all new cars.
-cruise-control : all new diesel cars
- 6) Standard tyre pressure +10% (ACEA, OICA, JAMA, KAMA)