



Ecodriving and Speed Limits

improving driver behaviour for saving fuel, reducing emissions and improving road safety, the principles and practise of Het Nieuwe Rijden, the Dutch ecodriving program

**WEC workshop Energy Efficiency in Mobility
Clingendael, The Hague, April 2, 2007**

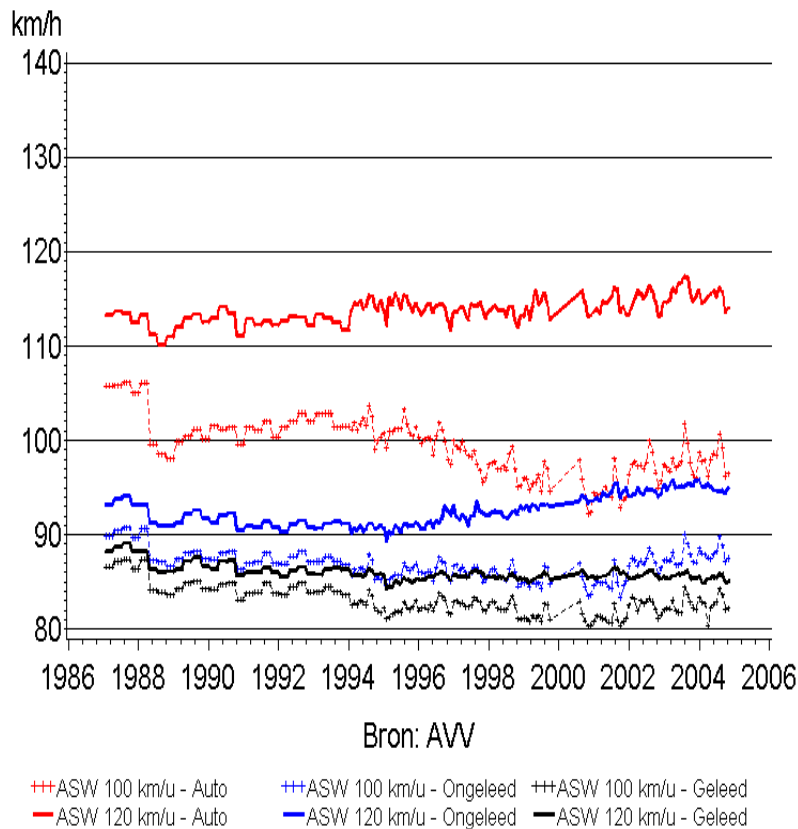
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Ministry of the Environment [VRM], The Netherlands
1986 - 2005**

Driver behaviour and environmental policies in NL

1986 - 2006

Vgem - gemiddelde rijnsnelheid



- 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/NO_x 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

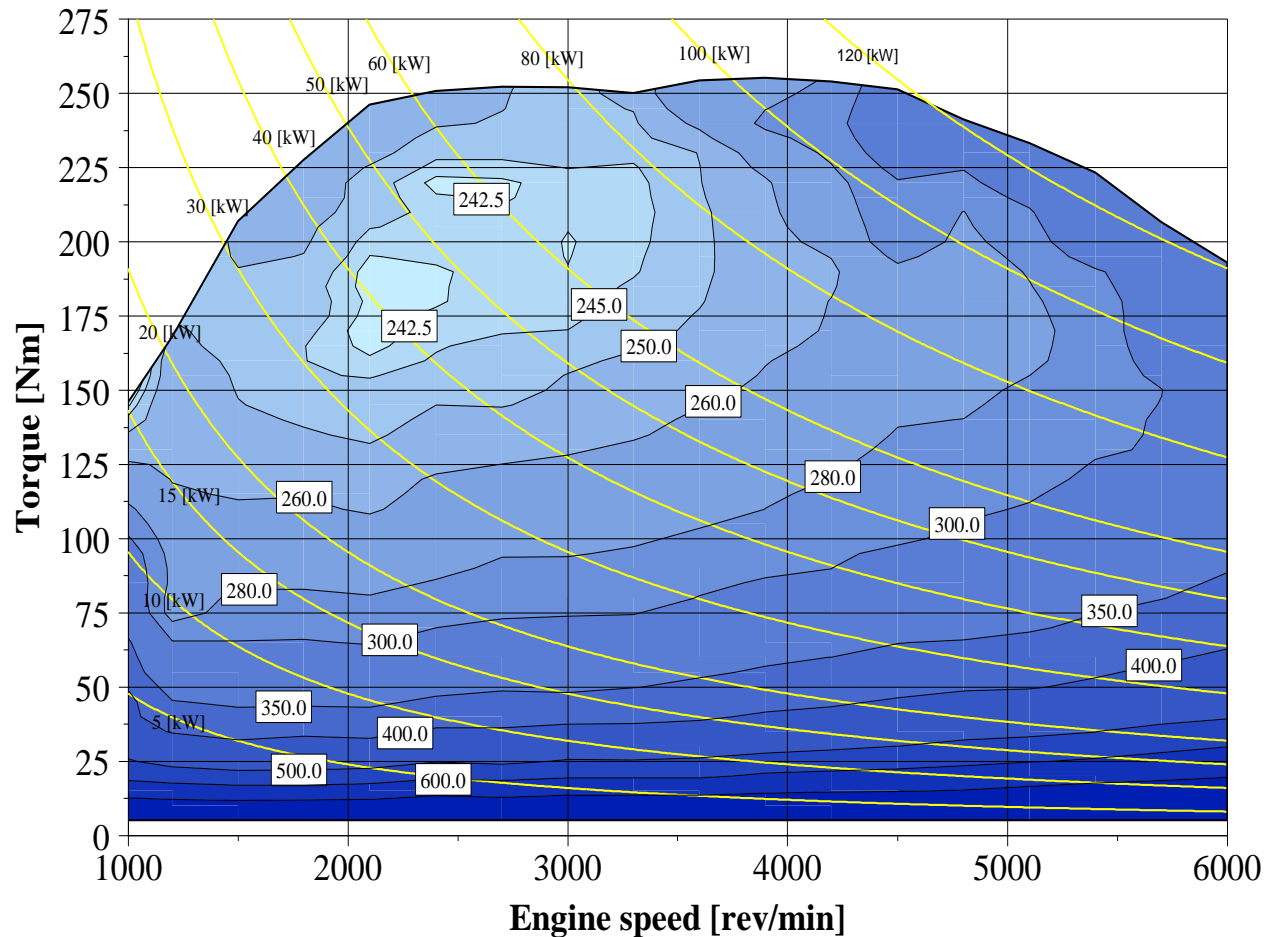
f.e./ CO2 system effects = total of individual f.e. effects

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)

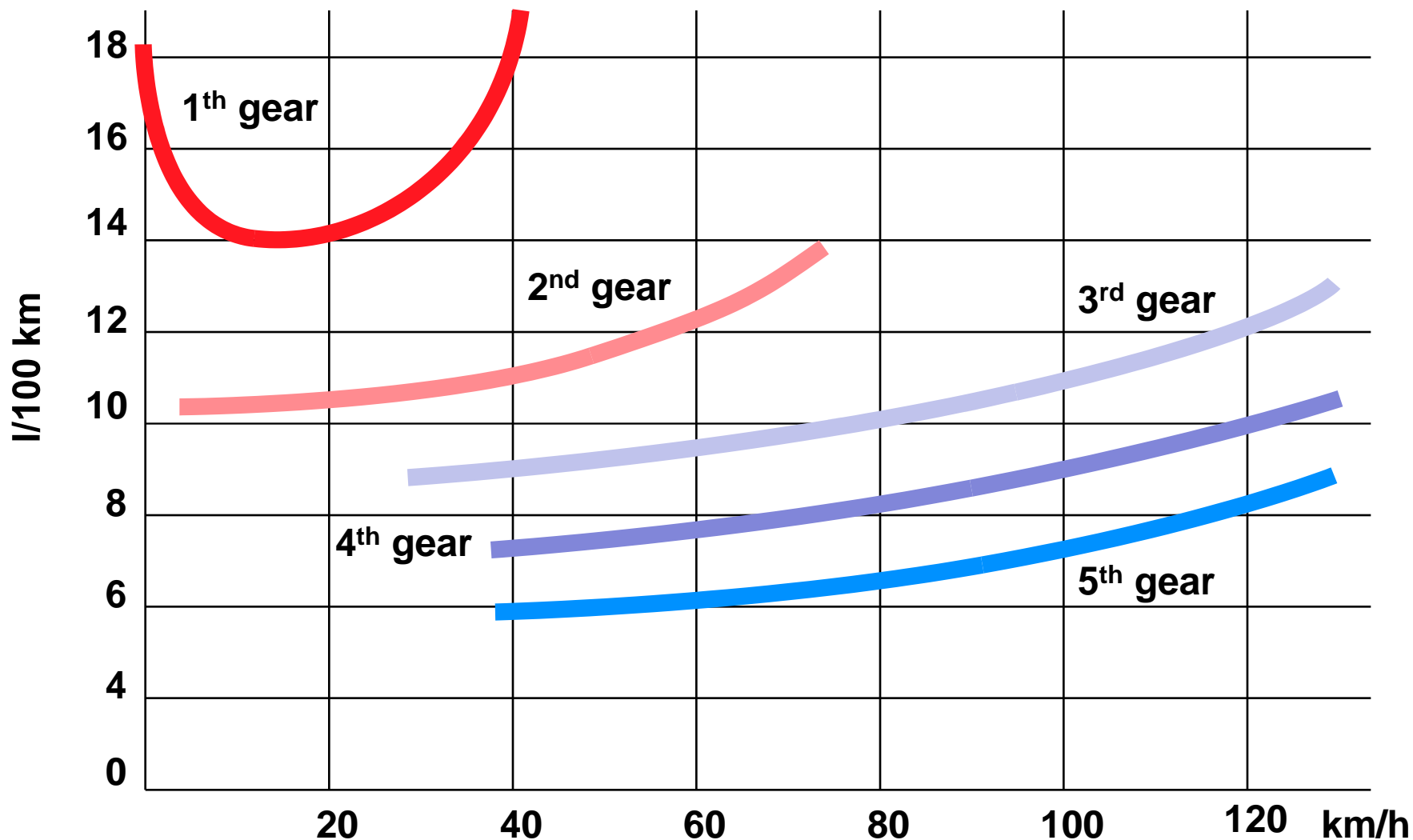
less idling & cold start short trips, tyre pressure +10%

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

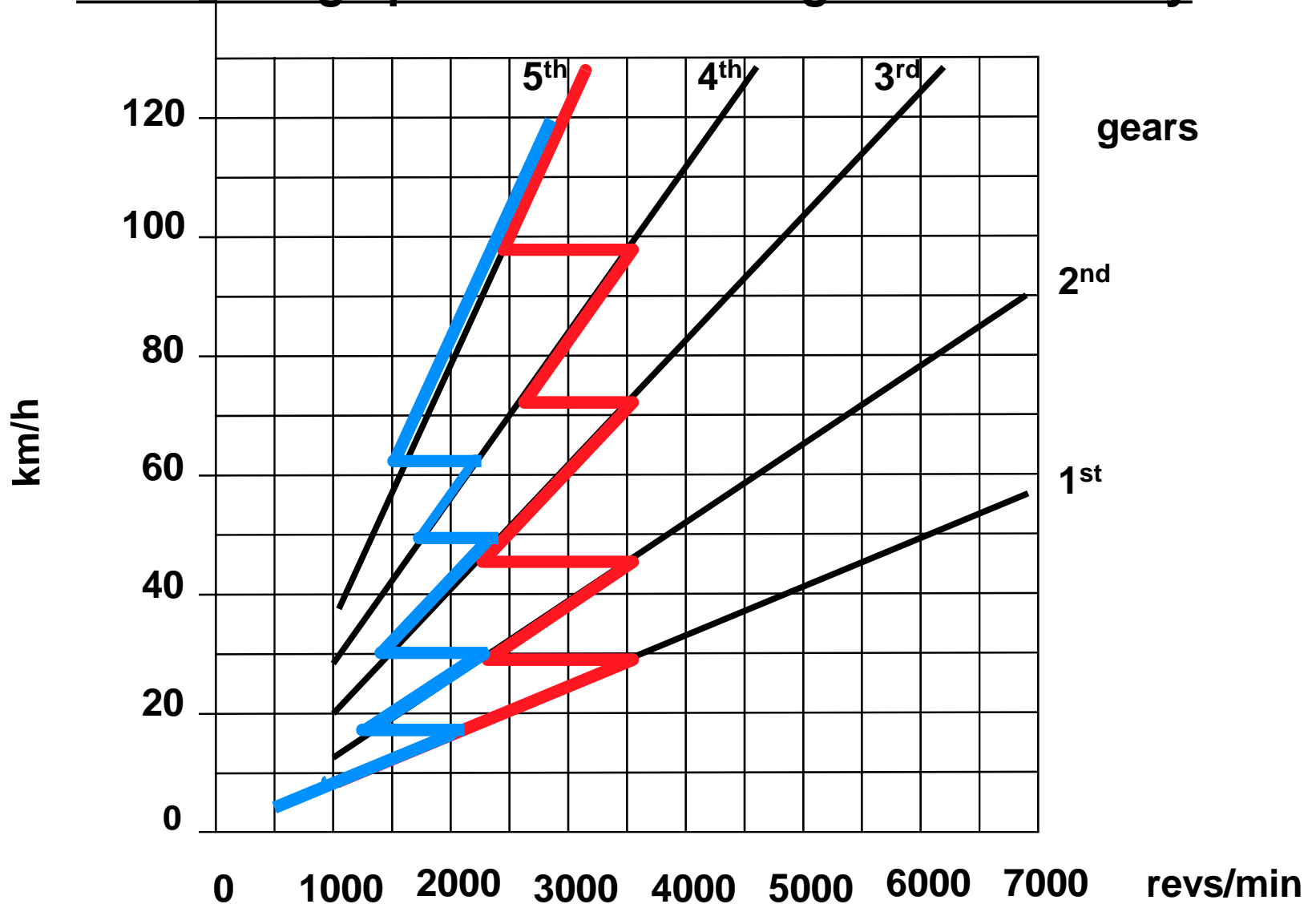
ECCP: EU 15 reduction estimates:

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

- **Email: p.wilbers@sinternovem.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)