The ADAC EcoTest

„Can we prevent another dieselgate?“
FIA Foundation, London

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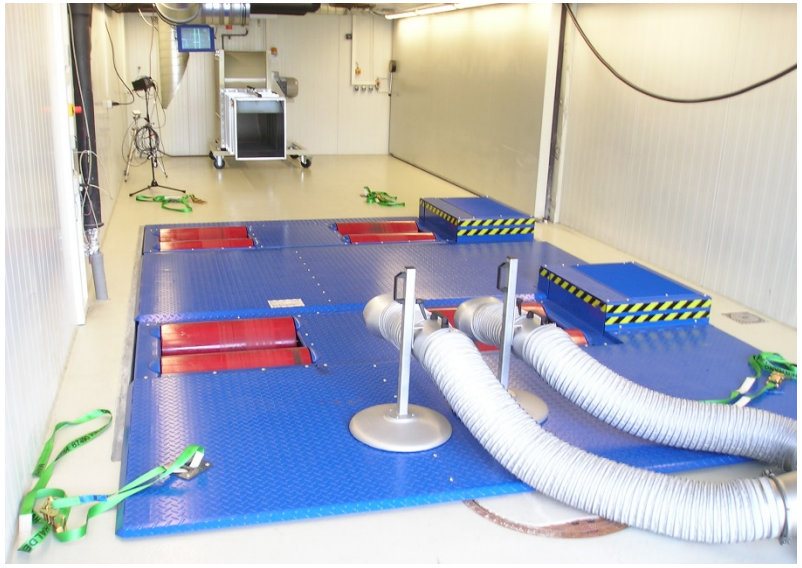
Dr.-Ing. Reinhard Kolke, ADAC Technik Zentrum


The players
in consumer protection:
FIA partner clubs, EU,
Federal Government, ICRT
FIA
ICRT
FIA Foundation
AA
AL
RACC
ACP
HAK
AMCS
ANWB
Umwelt Bundes Amt
test
Consumentenbond
konsument.at
which?
altroconsumo
DECO
CU
TESTACHATS
ADAC

ADAC emissions lab and low-temperature dynamometer



Emissions lab

- Temperature range: -10°C to +40°C
- max. speed 200 kph
- Simulation of uphill sections (up to 20%)
- CO, HC, CH_4, THC, NMHC, NO_x, NO, NO_2, PM, PN, CO_2
- official type approval lab accredited by KBA

Low-temperature dynamometer

- Temperature range: -25°C to +30°C
- Horsepower up to 2 x 260 kW (2 x 350 hp)
- max. speed up to 260 kph
- OBD data interface
- Variable wheelbase: between 2.36 and 3.36 m

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C From ADAC EcoTest to Green NCAP

ADAC EcoTest

- Since 2003 comprehensive consumer information regarding the eco-friendliness of vehicles
- Assessment of fuel consumption (CO_2 emissions) and pollutant emissions
- Based on specially developed real-life driving cycles, which go beyond the mandatory type approval test cycles
- Objective: innovation, light-weight design and fuel efficiency across all vehicle classes

Unlike under current legislation

- **No bonus for diesel engines**
- **No bonus for particulate emissions of petrol DI**
- **Test of aggressive driving emissions (highway / off-cycle)**
- **Well-to-wheel assessment for better comparability of electric vehicles (electric cars not generally “zero CO_2 emission vehicles”)**

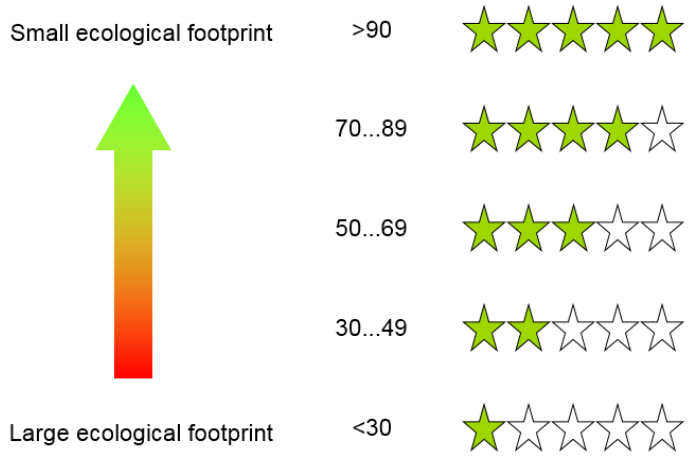
EcoTest rating is more than CO_2 and fuel consumption

A car has to be:

clean

efficient

tested under conditions near to reality

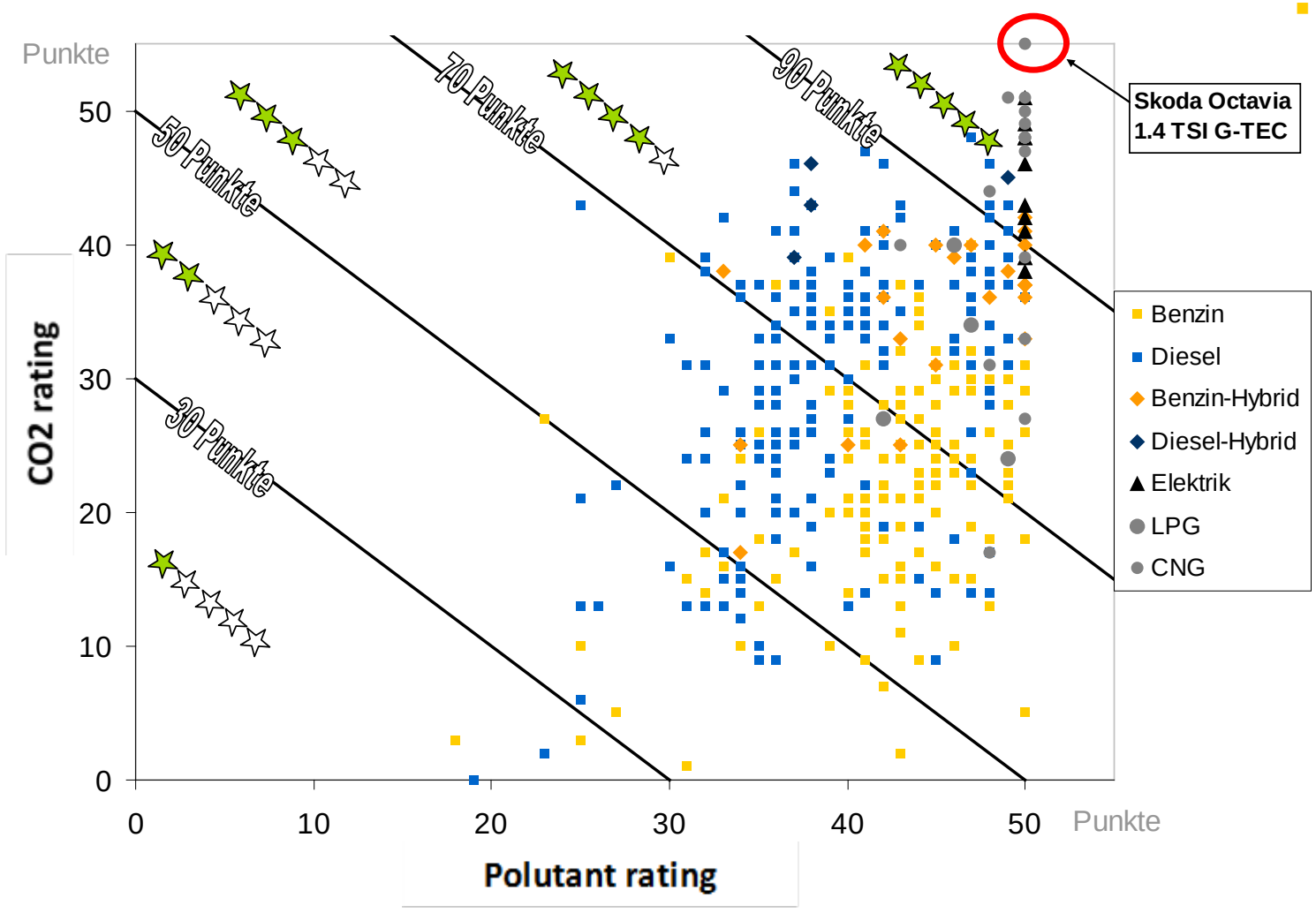


Polutant rating (absolut)

CO_2 rating (well-to-wheel, class dependent scale)

Additional information: Fuel consumption

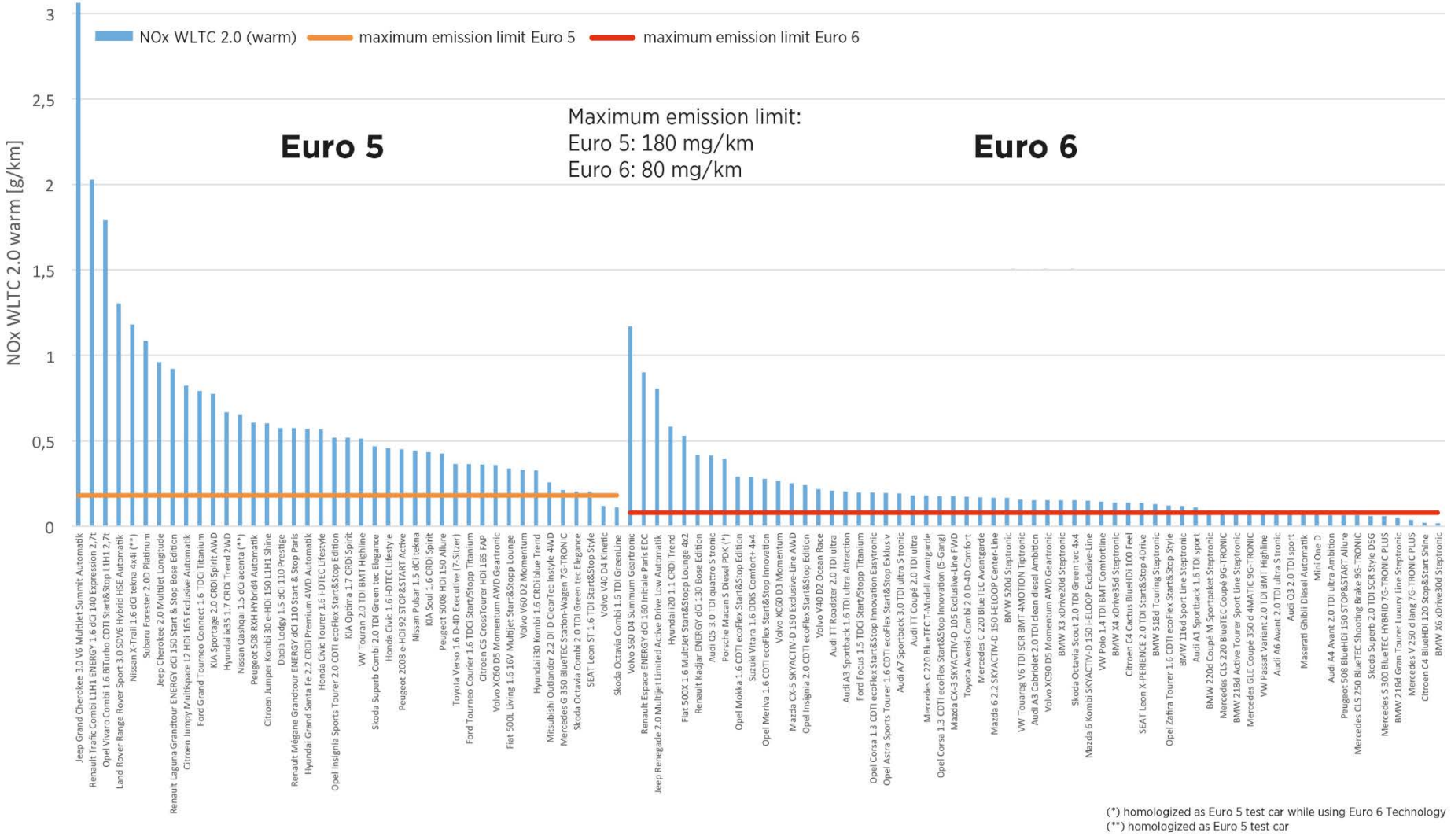
ADAC EcoTest – Results



- 5-Star Vehicles in EcoTest:
  - CNG e.g.:
    - » Skoda Octavia 1.4 TSI G-TEC
    - » VW Golf 1.4 TGI BlueMotion
    - » Audi A3 Sportback g-tron S tronic
    - » Mercedes E200 Natural Gas Drive
  - Elektro e.g..:
    - » VW e-up!
    - » BMW i3
    - » Nissan Leaf tekna
    - » VW e-Golf
    - » KIA Soul EV
    - » Ford Focus Electric
  - Hybrid e.g..:
    - » Toyota Prius 1.8 Plug-In Hybrid
    - » Mercedes S 300 BlueTEC Hybrid
    - » Toyota Prius 1.8 Hybrid
  - Diesel e.g.:
    - » Mercedes C 220 BlueTEC
    - » VW Golf 1.6 TDI BlueMotion
    - » Skoda Octavia 1.6 TDI Green Line

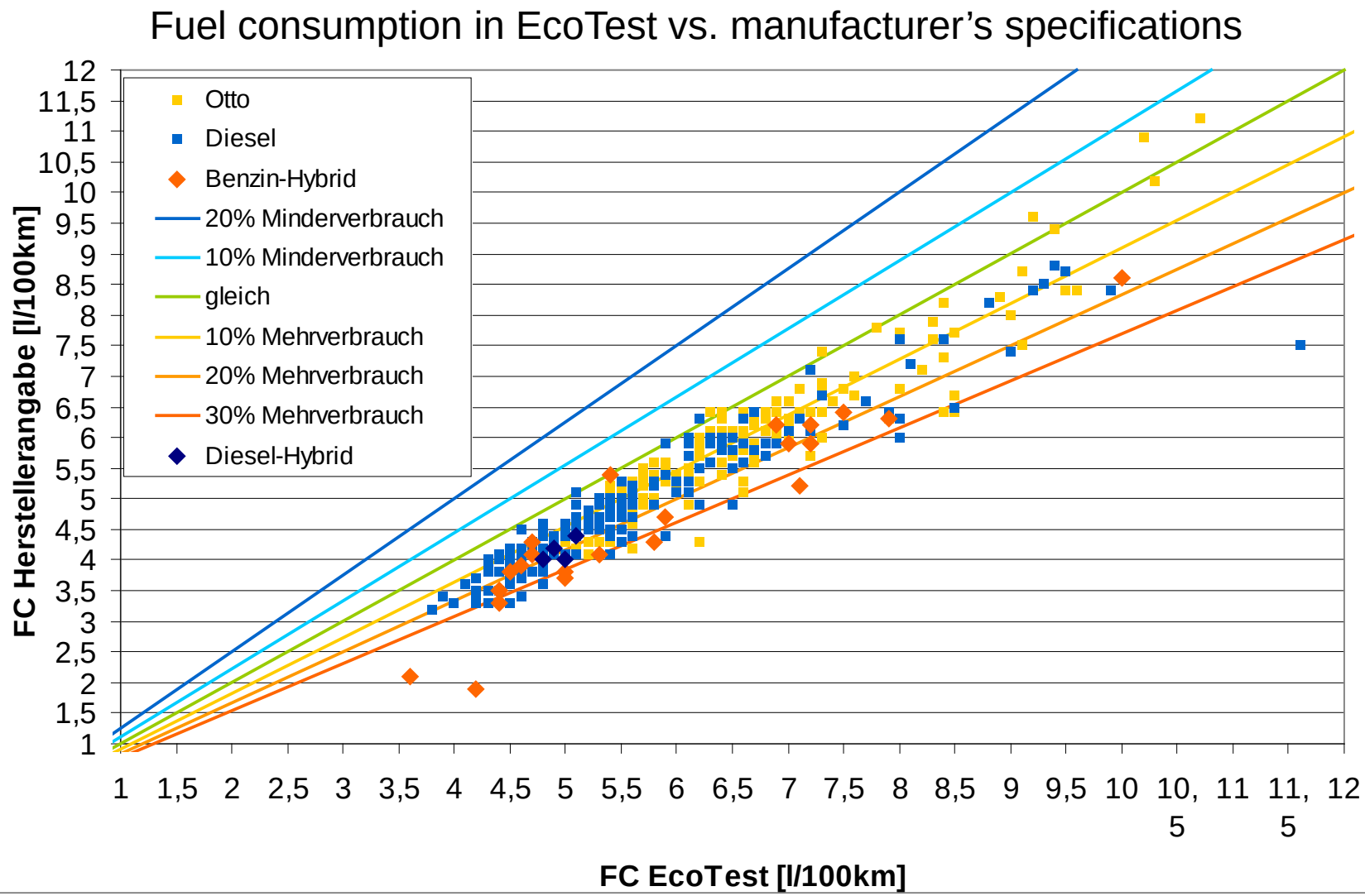
ADAC EcoTest: NOx WLTC 2.0 (warm)

Euro 5 and Euro 6 diesel cars - tested since 2014



(*) homologized as Euro 5 test car while using Euro 6 Technology
(**) homologized as Euro 5 test car

ADAC EcoTest – Results



Conclusion

- The ADAC EcoTest is the only popular eco-friendliness car rating, which is based on own measurements independent from car manufacturers.
- EcoTest measurements show already since several years
  - increased emission values off-cycle. Especially for NO_x (Diesel) and PN (Petrol DI)
  - increased fuel consumption in comparison to the manufacturer's information. The largest deviations are indicated for vehicles with electric and hybrid drive.

But, due to the new emission legislation (WLTP, RDE) and the actual dieselgate discussions, ADAC EcoTest will be adjusted once more in 2016.

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EcoTest 2016 – planned adjustments

EcoTest

Pollutants evaluation on emissions test bench (ETB)

- WLTP hot, WLTP cold, ADAC highway test
- HC, CO, NO_x, PM and PN
- across all classes
- Worst case across all

ETB CO_2 evaluation

- WLTP hot, WLTP cold, ADAC highway test
- WTW
- across all classes
- CF urban, extra-urban and highway

RDE

- Only vehicles having the potential for 4/5 stars on the ETB
- 2.1 conformity factor -> confirms 4 stars
- 1.5 conformity factor -> confirms 5 stars

EcoTest 2016 – additional ETB requirements

- ✓ **Air conditioning:** on during the hot test
- ✓ **Ambient temperature:** 22°C
- ✓ **Mass:** weighed mass + 250kg
- ✓ **Gear shift indicator:** on
- ✓ **2-axle operation**: on, no test bench mode (exceptions justified in writing)
- ✓ **Modes**: mode in which the car starts (if this mode remains active, then select “eco”)
- ✓ **Battery:** charge before cold start

EcoTest 2016 – ETB cycles

Previously: NEDC cold, WLTC hot, ADAC highway cycle

NEW:

- ✓ Warm up engine, adapt to load, coast (wheel friction curve taken from NEDC until WFC from WLTC is available)
- ✓ Conditioning run 3 minutes @ 50kph
- ✓ WLTC 5.3 (hot): with air conditioning, daytime running lights, gear shift indicator (serves as precon)
- ✓ Charge battery (necessary since engine bonnet open)
- ✓ WLTC 5.3 (cold): with air conditioning, daytime running lights, gear shift indicator
- ✓ Conditioning run 3 minutes @ 50kph
- ✓ ADAC highway cycle @ 130kph: with air conditioning, daytime running lights, gear shift indicator

EcoTest 2016 – ETB pollutant limits

Previously: Only NEDC cold and ADAC highway cycle, worst case PM separately

NEW:

- Stricter limits in line with ADAC call for 1.5 CF
- Worst case across all pollutants
- PN in all cycles
- PM and PN for all types of engines
- Ongoing CO and HC rating
- 0 points for exceeding Euro 6 limits
- All cycles taken into account

OLD

	NEFZ ★★★★★ 50 Punkte bei [g/km]	NEFZ ★☆☆☆☆ 10 Punkte bei [g/km]	ADAC Autobahn ★★★★★ 50 Punkte bei [g/km]	ADAC Autobahn ★☆☆☆☆ 10 Punkte bei [g/km]
HC	0,10 [a]	0,20 [d]	0,10 [a]	0,20 [d]
CO	0,50 [b]	1,00 [e]	0,50 [b]	7,00 [c]
Nox	0,06 [a]	0,25 [f]	0,06 [a]	0,70 [c]
PM	0,003 [c]	0,015 [c]	0,003 [c]	0,015 [c]
PN	6E+10 [c]	6E+12 [g]		

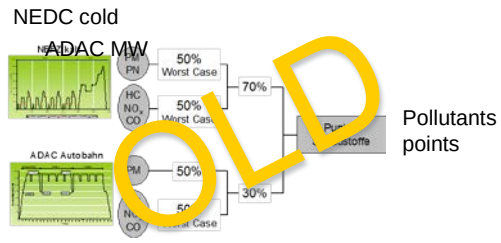
[a]) Euro 6 Otto
[b]) Euro 6b Diesel
[c]) ADAC EcoTest
[d]) Euro 3 Otto
[e]) Euro 4 Otto
f) Euro 4 Diesel
[g]) evtl. OBD GW

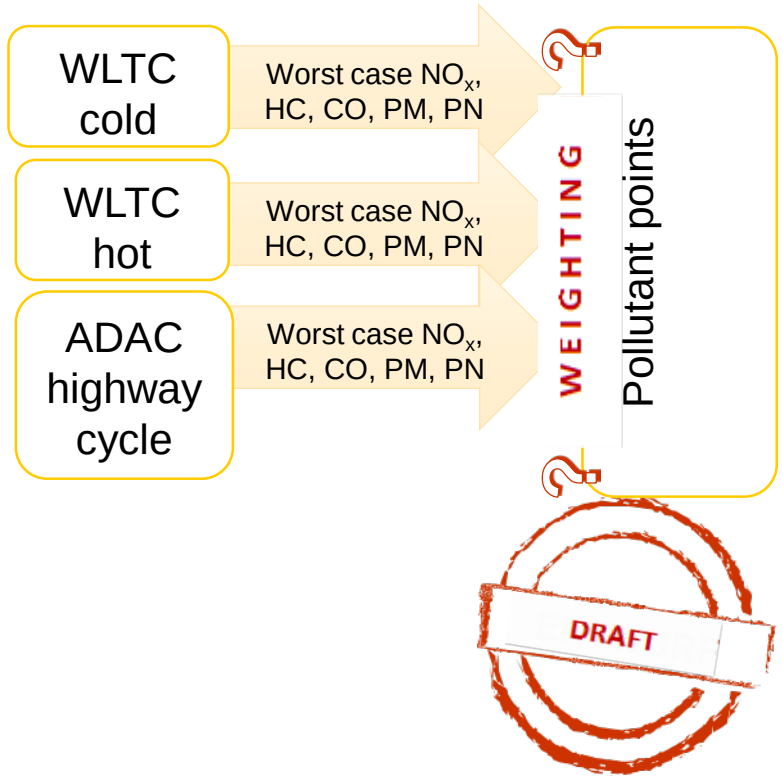
EcoTest 2016 – ETB pollutants weighting

Previously: 70% NEDC cold and 30% ADAC highway cycle

NEW:

- ADAC VEK: 1/3 urban, 1/3 extra-urban, 1/3 highway weighting remains valid
- Urban = Low (3km, 589sec) + Middle (5km, 433sec)
- Extra-urban = High (7 km, 455 sec) + Extra High (8 km, 323 sec)
- ADAC highway cycle (2 x 9.2km, 2 x 264sec)





EcoTest 2016 – ETB CO_2 limits

Previously: Class-based system

NEW:

- ✓ No classes
- ✓ Ongoing WTW rating
- Average of WLTP hot, WLTP cold and ADAC highway cycle
- Fuel consumption in urban, extra-urban and highway cycles

OLD

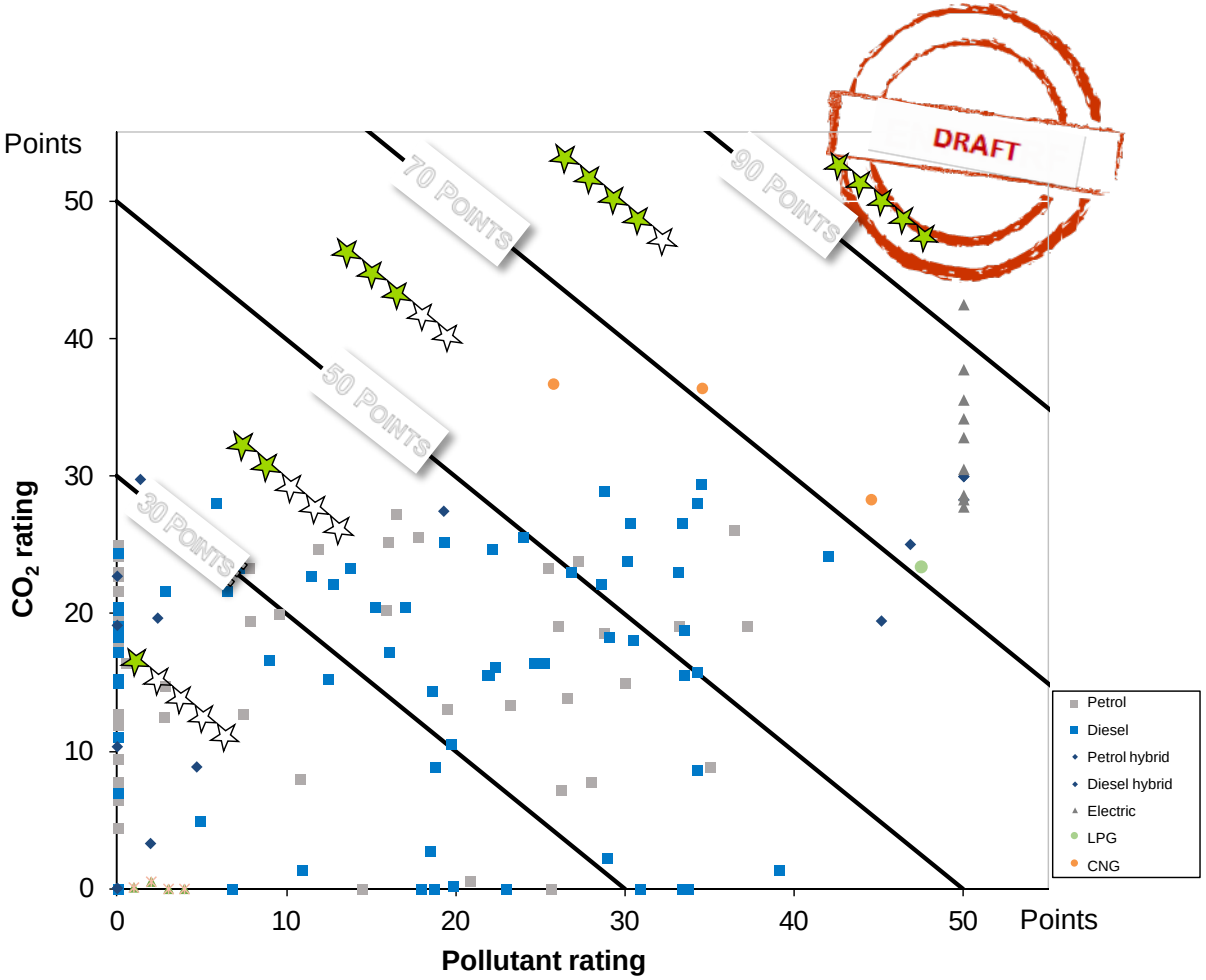
Fahrzeug-klasse	★★★★★ 50 Punkte bei [g/km]	★☆☆☆☆ 10 Punkte bei [g/km]
1	80	180
2	80	180
3	90	195
4	100	215
5	115	240
6	130	270
7	145	300

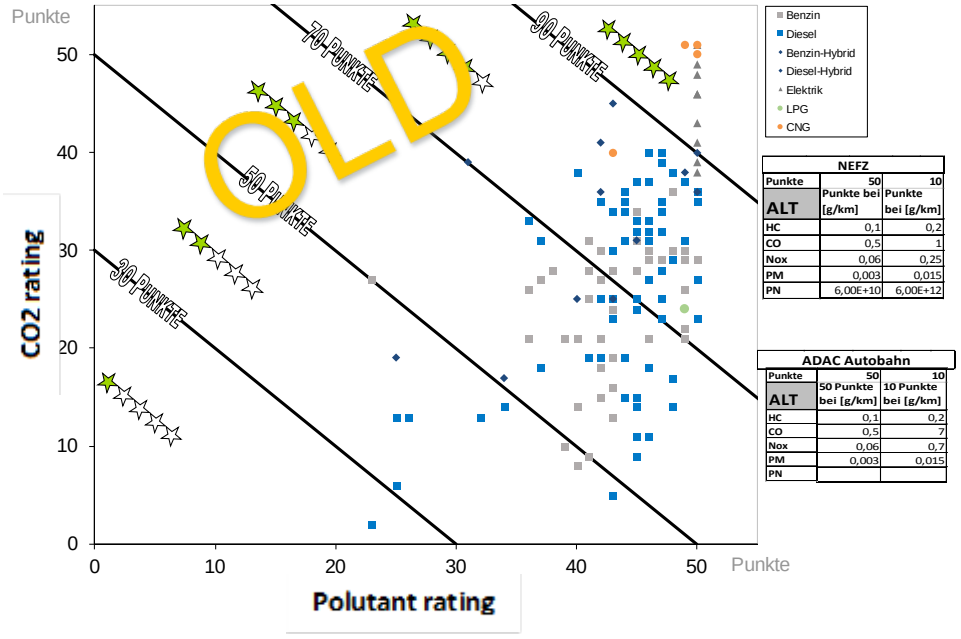
NEW: 50 230

DRAFT

Vehicle class	★★★★★ 50 pts @ [g/km]	★☆☆☆☆ 10 pts @ [g/km]
1	80	180
2	80	180
3	90	195
4	100	215
5	115	240
6	130	270
7	145	300

EcoTest 2016 – Results





NEFZ		
Punkte	50	10
ALT	Punkte bei [g/km]	Punkte bei [g/km]
HC	0,1	0,2
CO	0,5	1
Nox	0,06	0,25
PM	0,003	0,015
PN	6,00E+10	6,00E+12

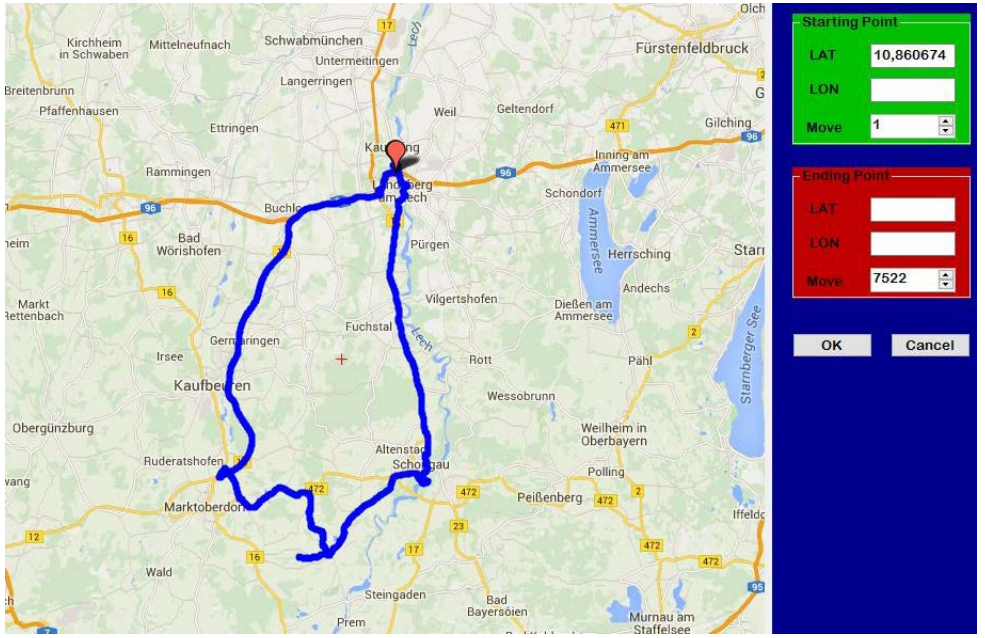
ADAC Autobahn		
Punkte	50	10
ALT	50 Punkte bei [g/km]	10 Punkte bei [g/km]
HC	0,1	0,2
CO	0,5	7
Nox	0,06	0,7
PM	0,003	0,015
PN		

EcoTest 2016 – RDE

Previously: No RDE

NEW:

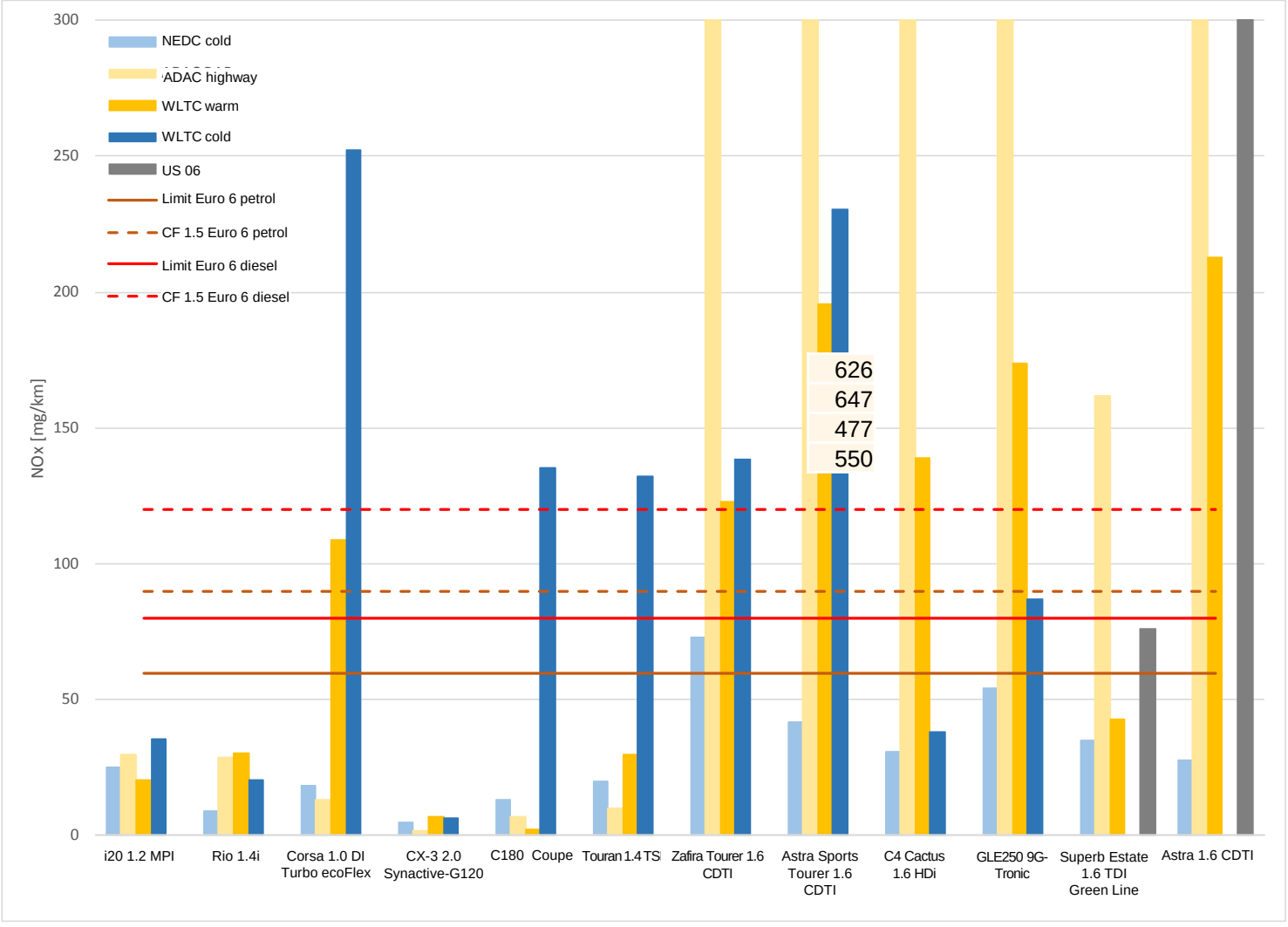
- First lap (test run) in line with directive, possibly a 2nd lap driven faster outside the requirements of the directive; the final decision to be taken when the first test metrics are in.
- Not feasible for all 150 Autotest car reviews
- Only vehicles having the potential for 4/5 stars on the ETB qualify for RDE test
- 2.1 conformity factor -> confirms 4 stars
- 1.5 conformity factor -> confirms 5 stars



EcoTest 2016 – NO_x compared across cycles

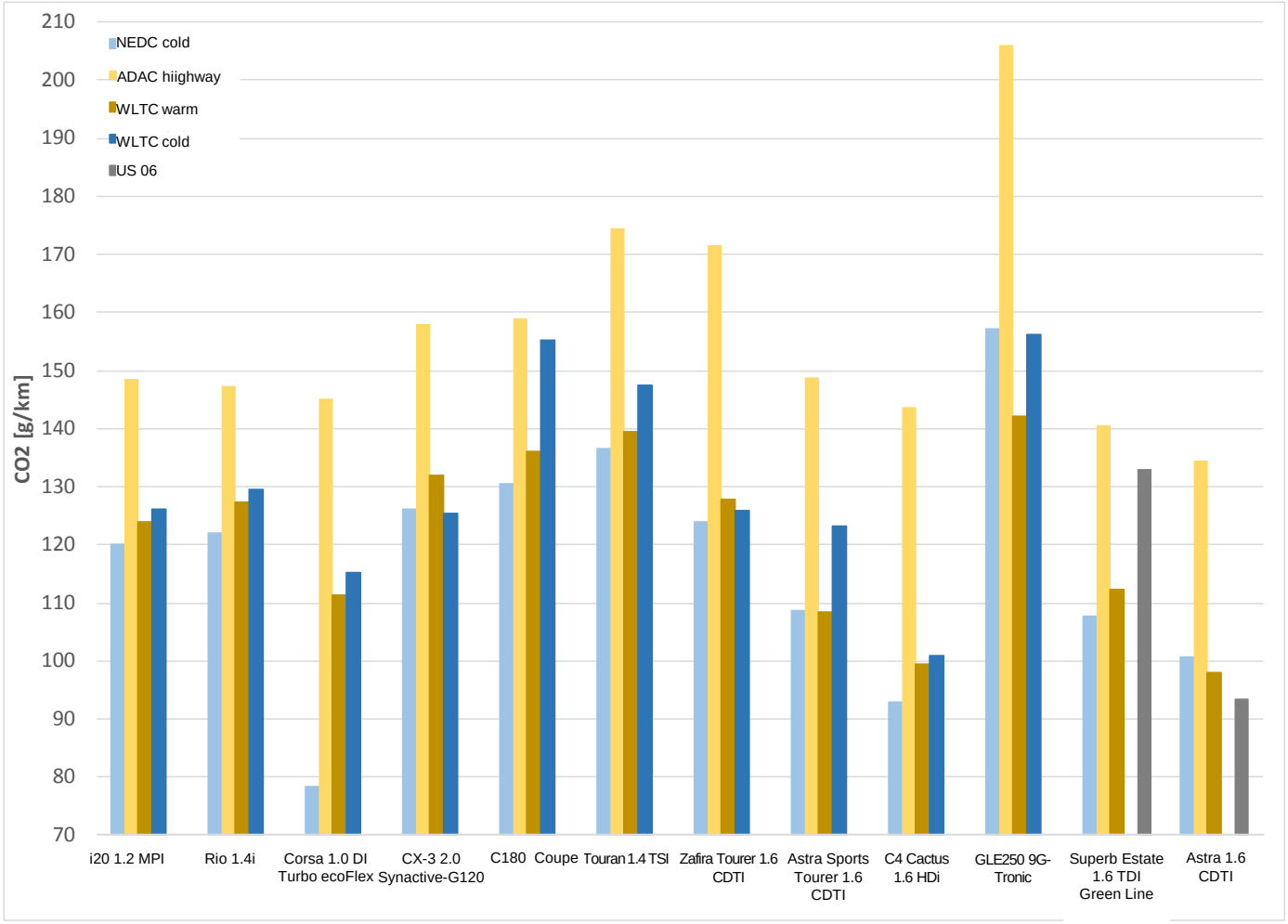
477-647 mg/km

- **WLTC cold:** compared to all other cycles, significantly higher NO_x emissions in DI petrol engines. Diesel behaviour varying
- **WLTC hot:** challenging for diesel engines
- **ADAC highway cycle:** diesel engines show very high NO_x emissions
- **US 06:** more NO_x than in WLTC hot



EcoTest 2016 – CO_2 compared across cycles

- **WLTC cold:** higher CO_2 emissions compared to WLTC hot
- **WLTC hot:** higher than NEDC cold
- **ADAC highway cycle:** high CO_2 emissions
- **US 06:** varying



Conclusion

- EcoTest rating will be improved once more by planned adjustments in 2016.
- EcoTest offers more realistic emission and fuel consumption data for consumers, based on car manufacturer independent measurements.

EcoTest can be used as a basis for the new Green NCAP protocol and roadmap.

Regarding WTT a conclusion for energy sources in different countries has to be developed to drive clean vehicle technology (efficient, clean), as well as clean energy production and energy supply.

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Green NCAP

- Green NCAP is a common Project of the Global New Car Assessment Program (GNCAP) and the Global Fuel Economy Initiative (GFEI).
- Partner of GFEI (Green Fuel Economy Initiative)
  - FIA Foundation
  - IEA
  - International Transport Forum
  - UNEP
  - ICCT
  - IST UC DAVIS.
- Aim
  - Development of a new rating system regarding the environmental friendliness of cars based on emissions and energy efficiency.
  - Implementation of a independent platform similar to Euro NCAP (rating system for vehicle safety)

Global NCAP Cars, EcoTest Results in Detail

Ford Fiesta 1.0 Trend

Suzuki Alto 1.0 Basic

VW Polo 1.2 Trendline

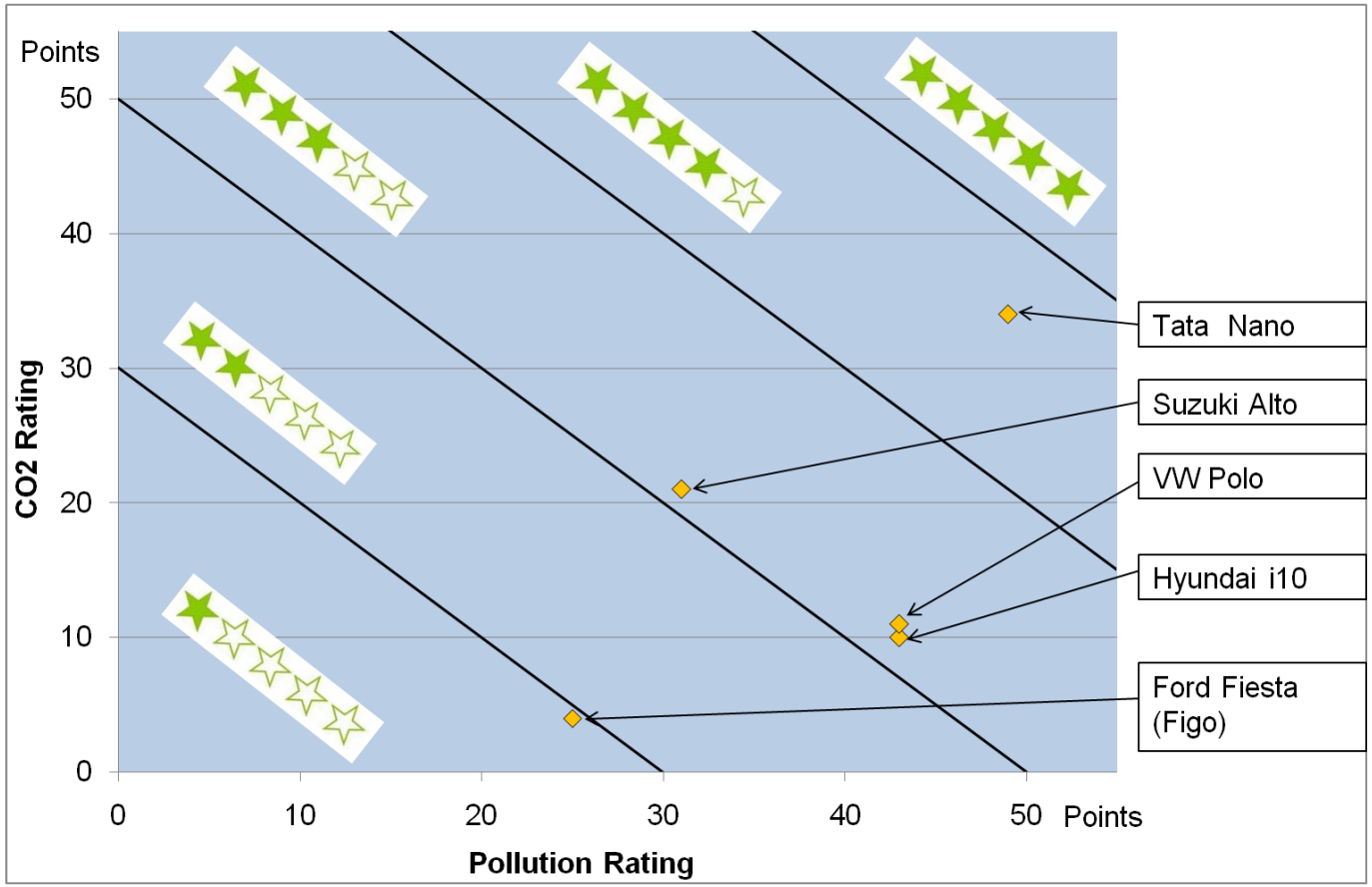
Tata Nano

Hyundai i10 1.1 Classic

Global NCAP Cars, EcoTest Results in Detail

Vehicle	Power [kW]	Engine/ fuel	FC [l/100km]	CO_2 EcoTest	Pollution Score	CO_2 Score	EcoTest Score	EcoTest Stars
Ford Fiesta 1.0 Trend	48	Gasoline	8,14	210,94	25	4	29	*
Hyundai i10 1.1 Classic	51	Gasoline	6,85	186,00	43	10	53	***
Suzuki Alto 1.0 Basic	50	Gasoline	5,70	151,69	31	21	52	***
Tata Nano	28	Gasoline	4,30	120,95	49	34	83	****
VW Polo 1.2 Trendline	51	Gasoline	7,12	195,78	43	11	54	***

Global NCAP Cars, EcoTest Results in Detail



- The best vehicle is the Tato Nano with 83 points in the EcoTest, the fuel consumption is 4.30 l/100 km or 25.32 mpg (US), resulting in CO_2-emissions of 121.0 g/km (WTW).
- The worst vehicle is the Ford Fiesta with 29 points in the EcoTest, the fuel consumption is 8.14 l/100 km or 47.93 mpg (US), resulting in CO_2-emissions of 210.9 g/km (WTW).

EcoTest as a Phase-in for a Green NCAP Roadmap

Funding	High Awareness	High Quality	Best Tests Roadmap
Write a Funding Scheme for a Funding Request by Global NCAP, Green NCAP	**Develop a brand based on** ADAC 150 Europ. cars + Latin NCAP, Global NCAP	**Develop an partnership scheme and accreditation / quality scheme for partner and labs**	**Develop a roadmap for further investigations, RDE, worldwide rollout or cities**

GREEN NCAP

GreenNCAP

GREEN NCAP

Thank you for your attention!