European Commission

AFTER CO2MPAS - INTERPRETATION OF RESULTS

2nd workshop with OEMs
Ispra, December 12-13, 2016

Joint Research Centre

WILL BE DISCUSSED

- Interpretation of CO2MPAS results
- Random Sampling
- Individual Vehicles and Interpolation

CO2MPAS REPORT

CO2MPAS detailed report contains all input/output data, charts, summarized results.

Two important tabs for TA process are:

1. OUTPUT REPORT and
2. DICE REPORT

CO2MPAS OUTPUT REPORT

1. If CO2MPAS deviation <4% OEM declared NEDC CO2 value is accepted;

2. If CO2MPAS deviation >4% OEM has option to accept new value or to request physical test.

CO2MPAS SUMMARY OUTPUT REPO

TA Certificate Number	
CO2MPAS version	*1.4.1rc0*
Date/Time	*2016/11/22-14:19:09*
Type approval mode	***True***

NEDC Average Specific CO2 Emissions*	Vehicle H	Vehicle L	units
NEDC CO2 declared value	*145.31*	*143.90*	g/km
NEDC CO2MPAS simulated	*145.39*	*142.31*	g/km
CO2MPAS deviation	***0.05***	***-1.10***	%

*Ki factor - corrected

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CO2MPAS OUTPUT REPORT

$$CO_2 = NEDC_{CO_2} * K_i$$

NEDC Average Specific CO2 Emissions*	Vehicle H	Vehicle L	units
NEDC CO2 declared value	*145.31*	*143.90*	g/km
NEDC CO2MPAS simulated	*145.39*	*142.31*	g/km
CO2MPAS deviation	***0.05***	***-1.10***	%

*Ki factor - corrected

NEDC CO2MPAS CO2 Emissions	Vehicle H	Vehicle L	
CO2MPAS simulated NEDC	*145.39*	*142.31*	g/km
CO2MPAS simulated UDC	*161.34*	*157.63*	g/km
CO2MPAS simulated EUDC	*136.14*	*133.43*	g/km

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CO2MPAS OUTPUT REPORT

From OUTPUT REPORT phase-specific CO2 values should be calculated

$$NEDC\ CO_{2,p,H} = NEDC\ CO_{2,p,H,c} \cdot CO_{2,AF,H}$$

NEDC CO2MPAS CO2 Emissions	Vehicle H	Vehicle L	
CO2MPAS simulated NEDC	*145.39*	*142.31*	g/km
CO2MPAS simulated UDC	*161.34*	*157.63*	g/km
CO2MPAS simulated EUDC	*136.14*	*133.43*	g/km

$CO_{2,\ AF}$ is adjustment factor and ratio between final combined NEDC CO_2 (declared, CO2MPAS) and CO2MPAS simulated value.

CO2MPAS DICE REPORT

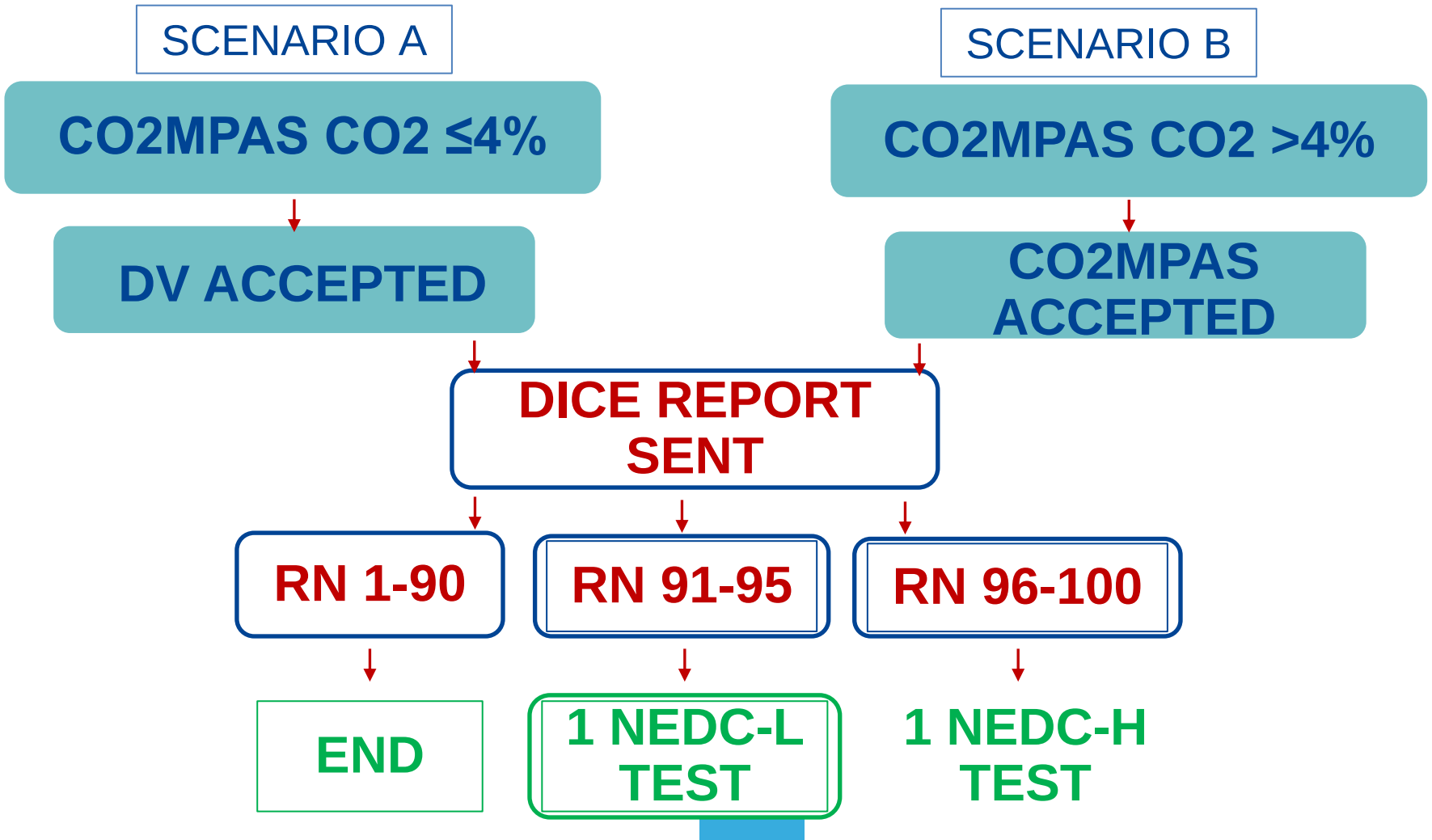
For each WLTP interpolation family this file should be sent to a functional mailbox – as a result random number will be received (from 1 to 100).

CO2MPAS DICE REPORT

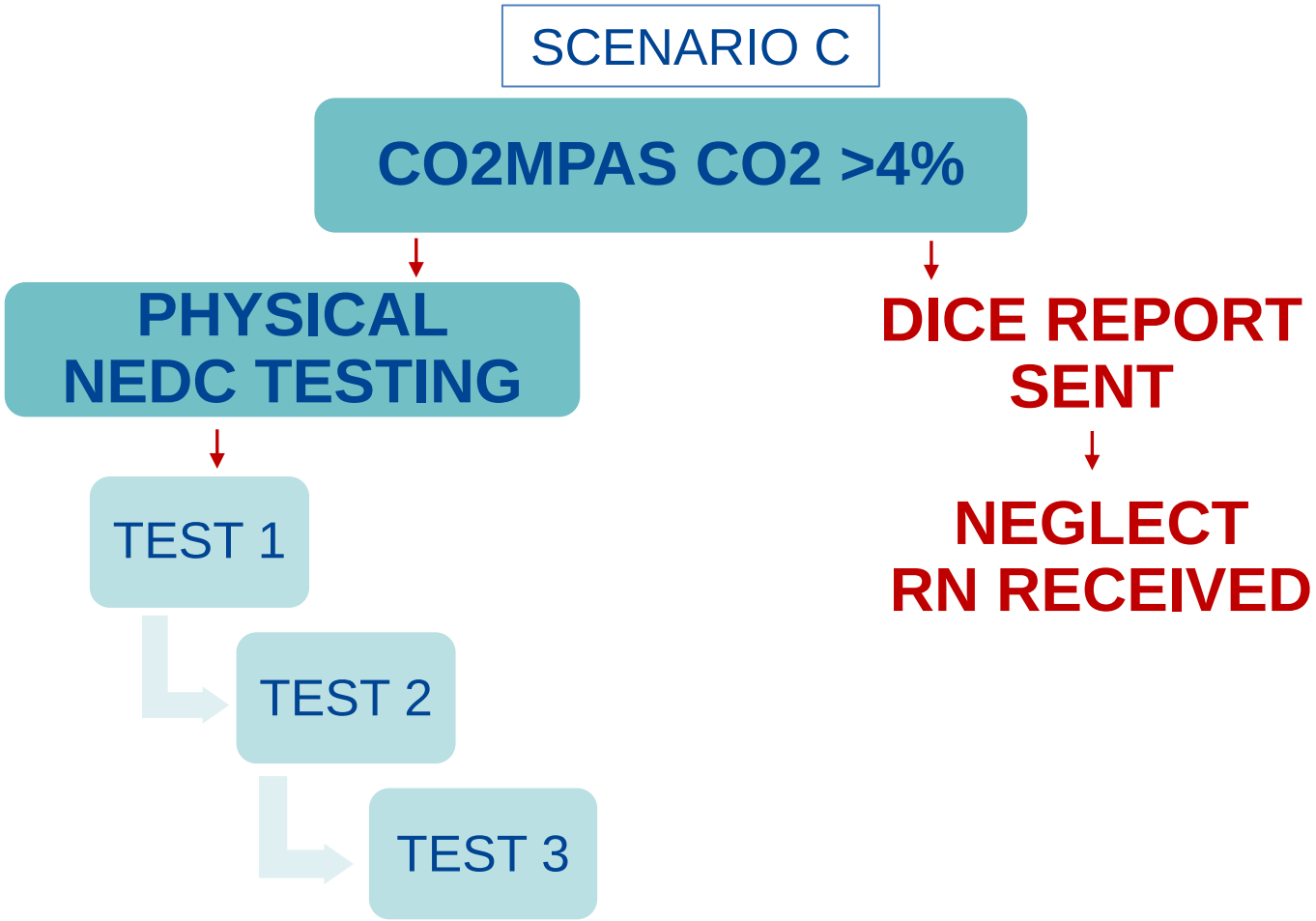
TA Certificate Number	
CO2MPAS version	1.4.1rc0
Date/Time	2016/11/22-14:19:09
Type approval mode	True

	Vehicle H	Vehicle L	units
Fuel Type	diesel	diesel	-
Engine Capacity	2041.00	2041.00	cc
Gearbox type	manual	manual	-
Turbo engine	TRUE	TRUE	-
sub_models_uuid	b'\x80\x03}q\x00(X\x0	b'\x80\x03}q\x00(X\x0	-
alternator_model score	4.44	6.01	A
at_model score			-
clutch_torque_converter_model score	0.35	0.35	RPM
co2_params score	0.00	0.00	CO2g/s
engine_cold_start_speed_model score	0.00	0.05	RPM
engine_coolant_temperature_model score	0.87	0.81	°C
engine_speed_model score	0.00	0.00	RPM
start_stop_model score	-1.00	-1.00	-
CO2MPAS deviation	0.05	-1.10	%

RANDOM NUMBER



RANDOM NUMBER



RANDOM TESTING

Only in cases where CO2MPAS was used to confirm declared value there is 10% of chance for performing one random physical test.

From this test **Verification Factor** and **Relative Deviation** should be recorded in TA certificate and CoC.

Verification Factor is used to check accuracy of the input data (fuel saving gear, start-stop activation time, and BERS). In case of non conformity it shall be set to 1.

Relative Deviation is deviation between measured and OEM declared value

$$De = \frac{RTr - DV}{DV}$$

CORRECTION TO FLEET

When for one family is found that Relative Deviation is > 0.04 and/or Verification Factor is 1 correction for the whole fleet is required

$$\text{Correction factor} = 1 + \frac{\sum_{i=1}^{N} De_{,i} \cdot r_i}{\sum_{i=1}^{N} \delta_{3,i} \cdot r_i}$$

r_i is the number of annual registrations of vehicles belonging to the respective WLTP interpolation family i concerned;

$\delta_{3,i}$ is equal to 0 if De_i is missing and equal to 1 otherwise;

N is the number of WLTP interpolation families for which a manufacturer is responsible.

INDIVIDUAL VEHICLES AND INTERPOLATION

VEHICLE L

CO2MPAS

WLTP TEST

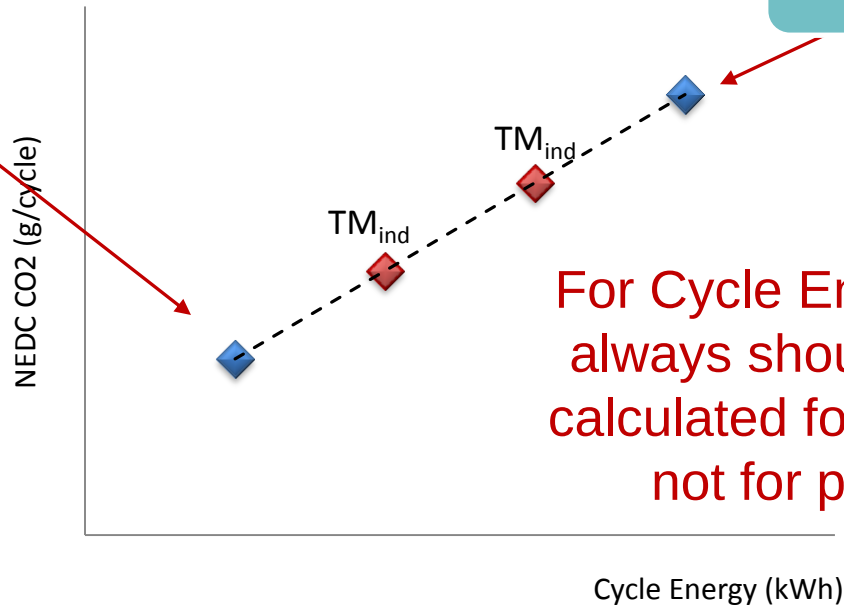
NEDC-L CO2

VEHICLE H

CO2MPAS

WLTP TEST

NEDC-H CO2



For Cycle Energy calculation always should be used RLs calculated for CO2MPAS and not for physical tests

Questions ?