

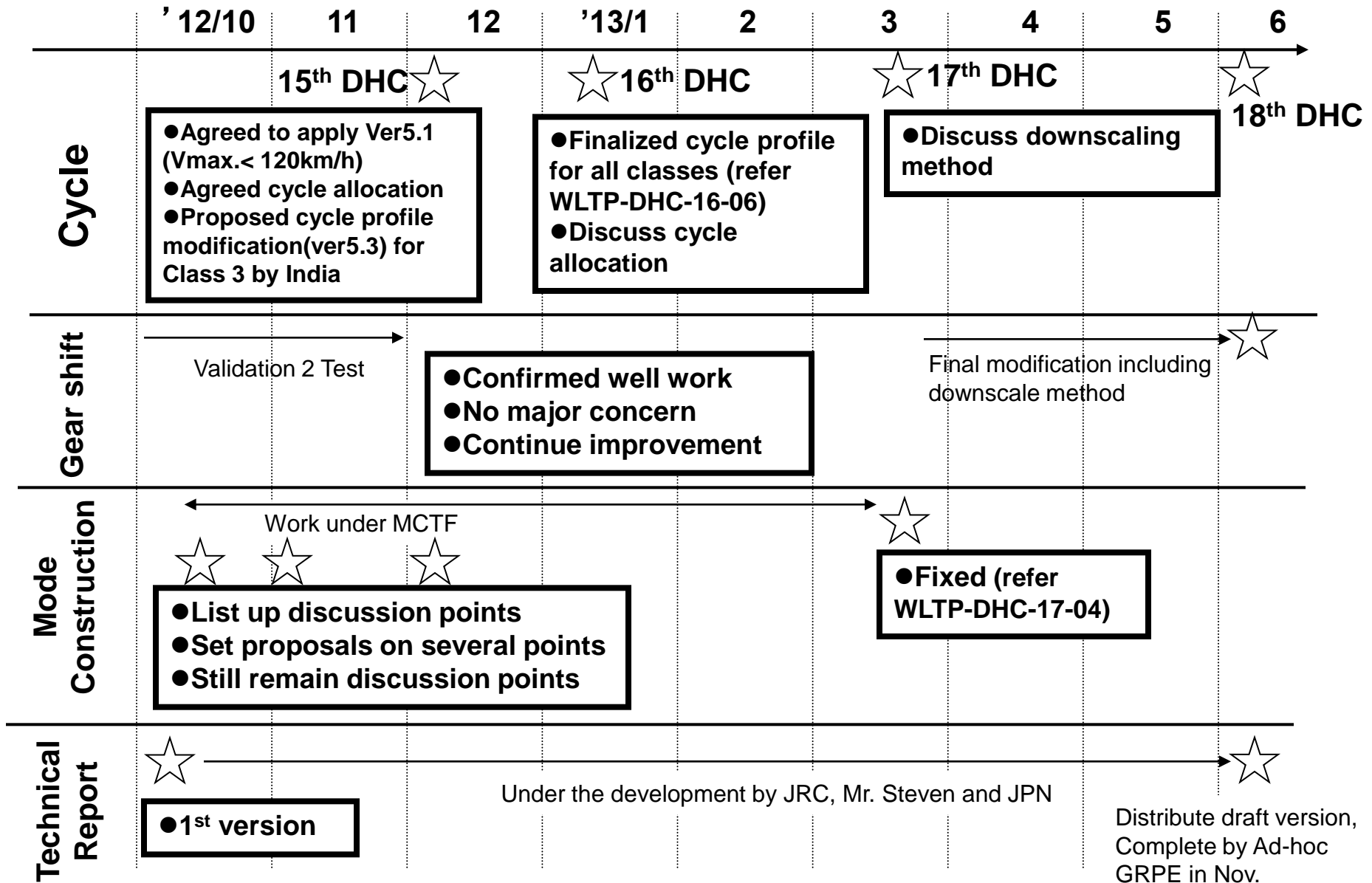
**Progress Report of**  
**World-wide Light-duty Test Cycle**  
**and Mode Construction**

Prepared by WLTP-DHC/MCTF  
under GRPE/WLTP informal group

66<sup>th</sup> GRPE  
6<sup>th</sup>/7<sup>th</sup> June. 2013  
Palais des Nations, Geneva

1. Progress since 65<sup>th</sup> GRPE meeting
2. Cycle Profile
3. Cycle Allocation and Downscale Method
4. Mode construction
5. Gear Shift Prescription
6. Open Issues Lists
7. Technical Report
8. Next actions

# 1. Progress since 65<sup>th</sup> GRPE

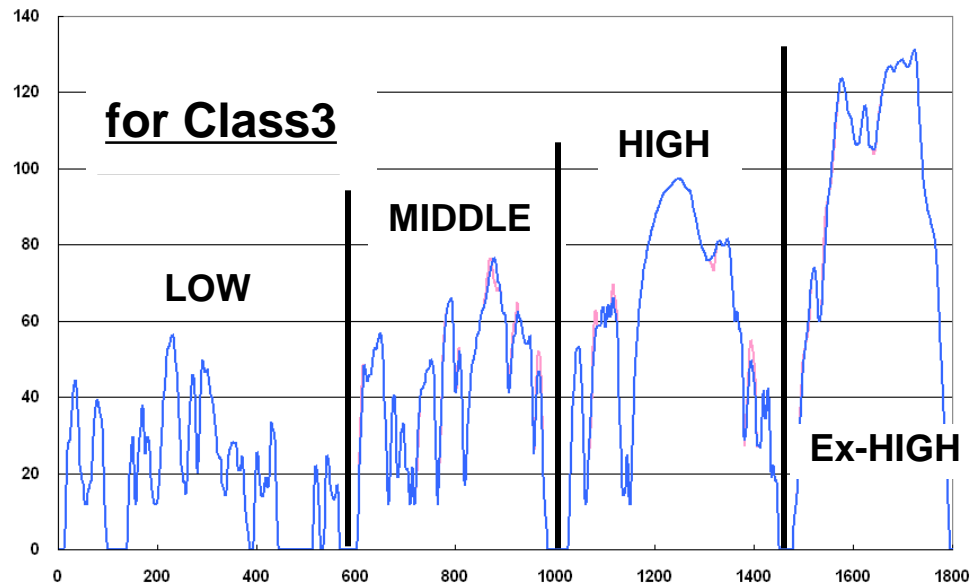
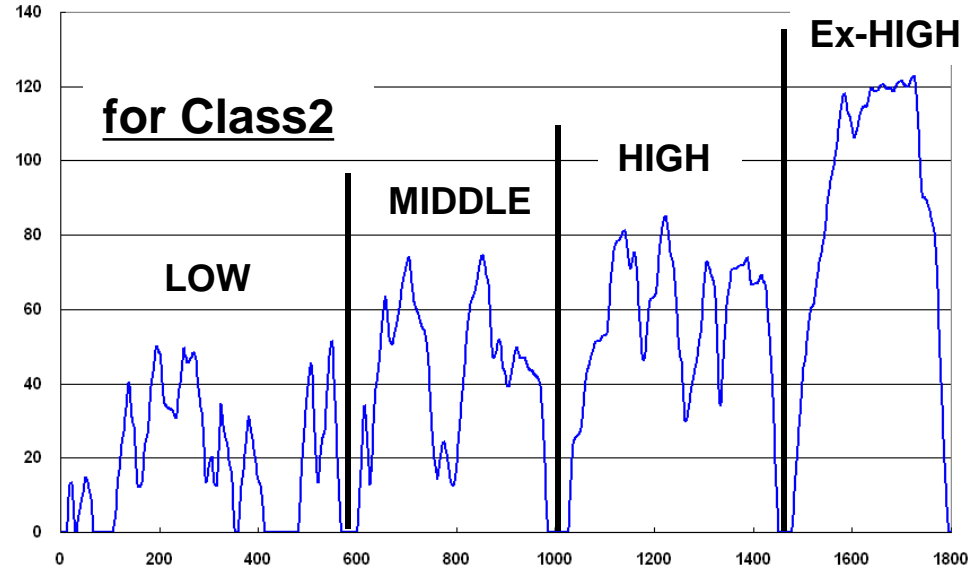
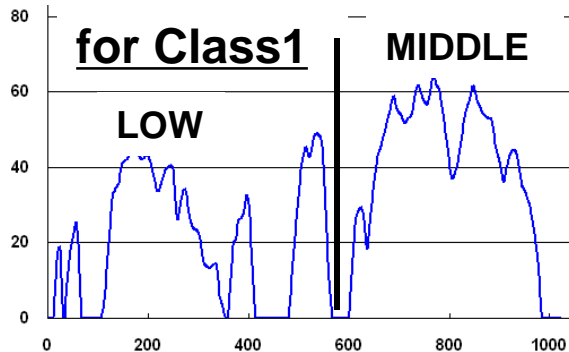


## 2. Cycle Profile

During 16<sup>th</sup> DHC meeting, it was agreed to modify the cycle profile (Ver5.3 proposed by India) for Class3.

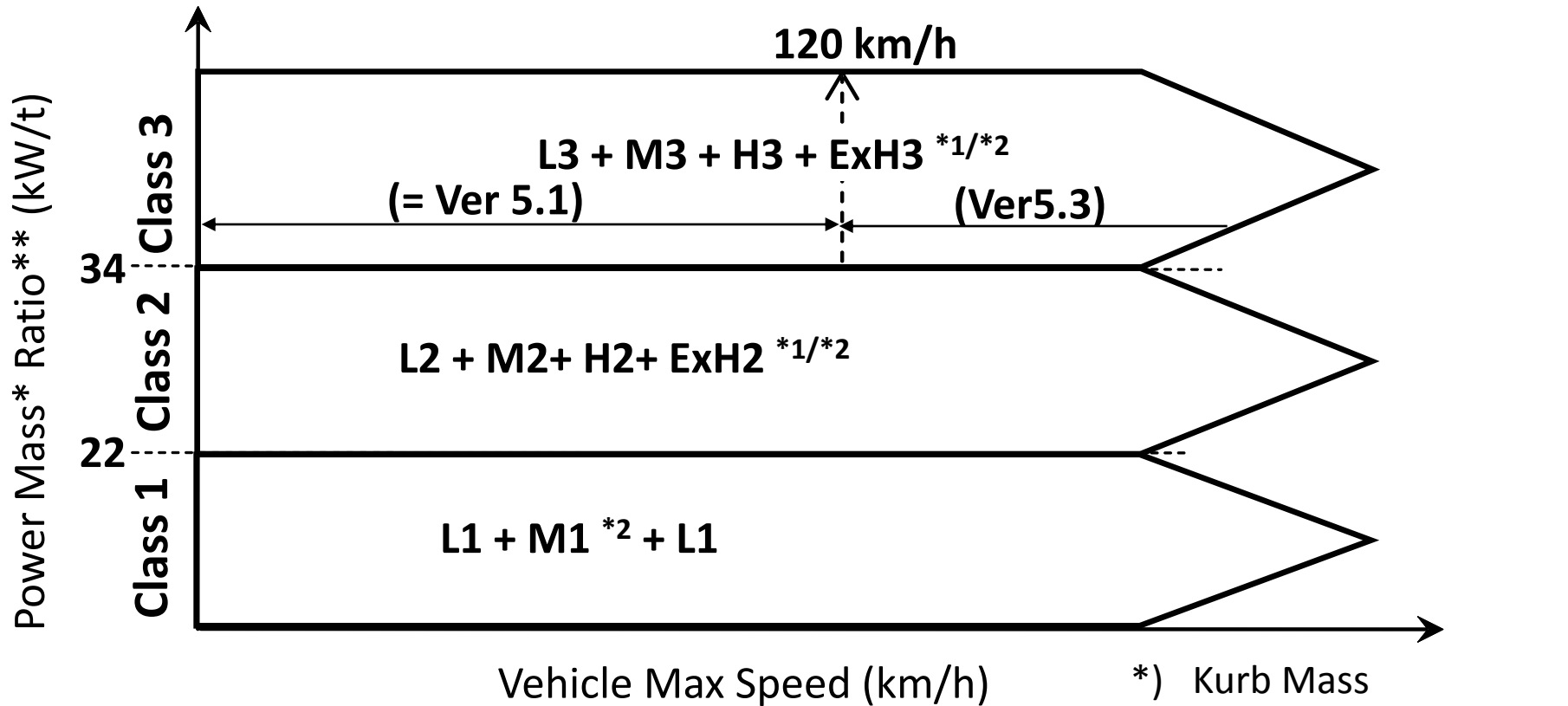
→DHC has successfully developed the harmonized test cycles.

Specific time table of each cycle profile can be seen in WLTP-DHC-16-06 (UN web site)



# 3-1. Cycle Allocation

During 18<sup>th</sup> DHC meeting (Jun 2013), the following cycle allocation was agreed with adopting the downscale method.



\*) Kurb Mass  
 \*\*) all electrified vehicles belong to Class3

\*1) exempted as per CPs need

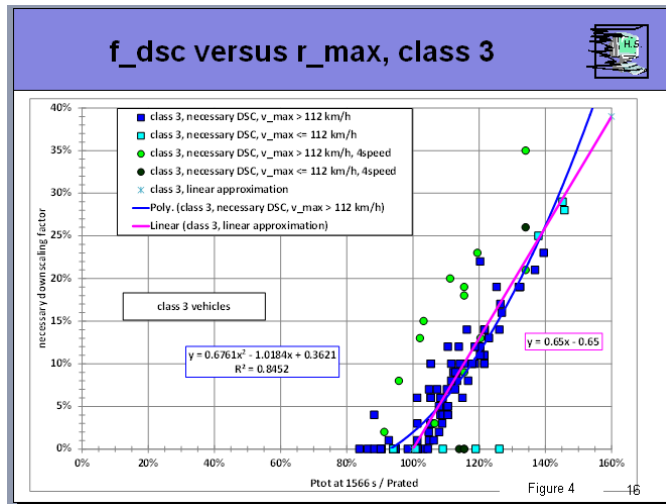
\*2) downscaled cycle according to vehicle specification

## 3-2. Downscale Method

Please refer WLTP-DHC-18-04 for downscale procedure and WLTP-DHC-18-03 for its technical justification.

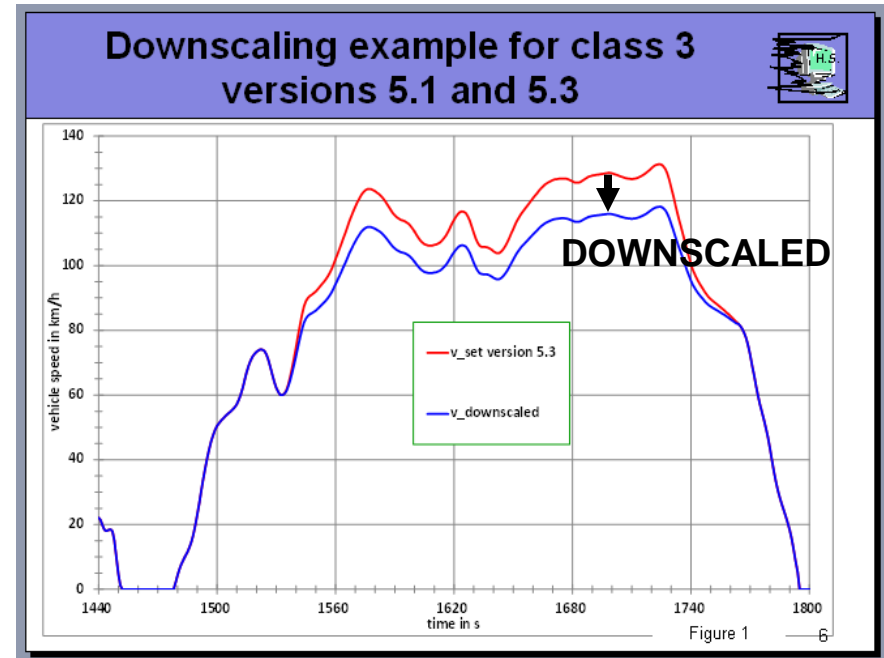
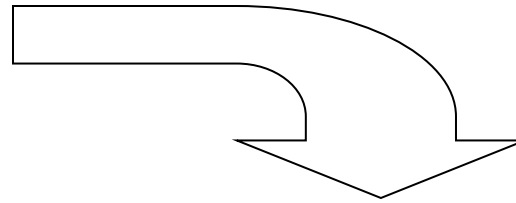
Developed by Mr. Steven and Validated by mainly India.

Downscale ratio



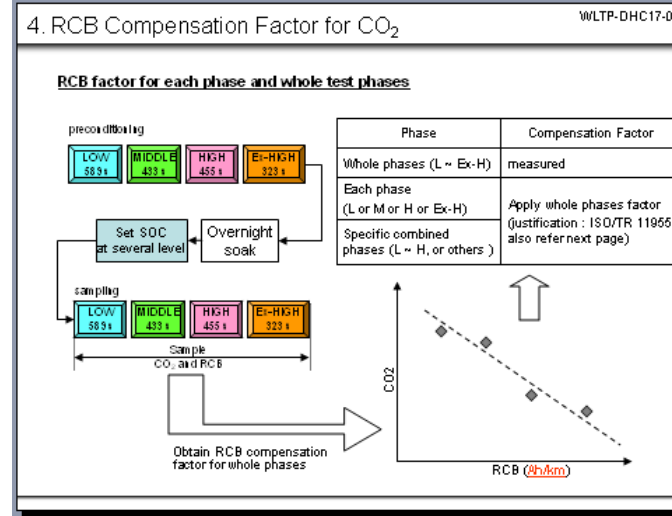
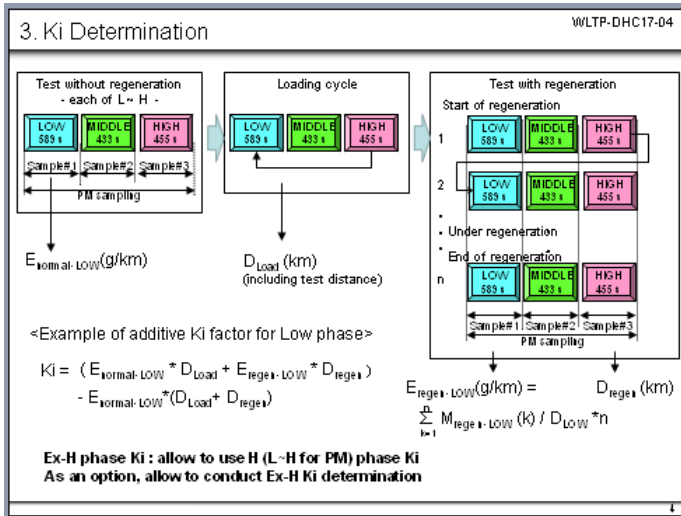
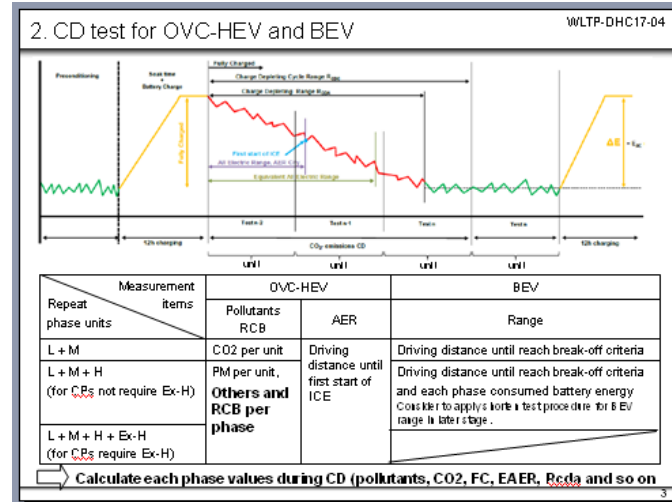
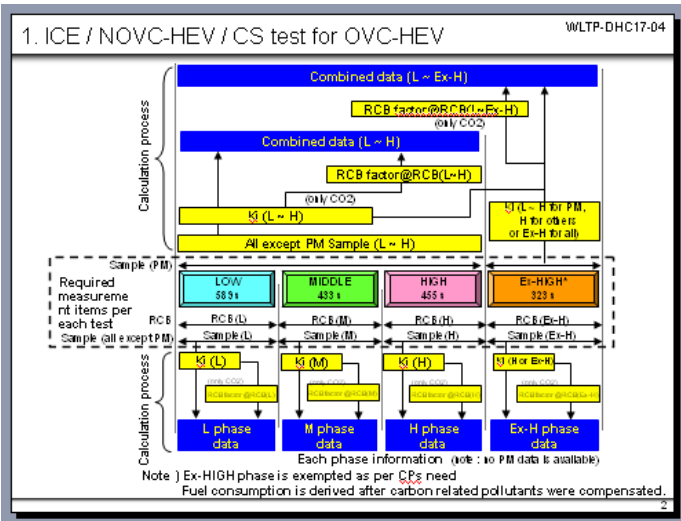
Vehicle specification

Need to finalize the downscale calculation formula mainly by Mr. Steven, India and other CPs.



# 4. Mode Construction

During 16<sup>th</sup> DHC meeting (Mar 2013), the following mode construction was agreed (please refer WLTP-DHC-17-04 for more detail)



Mr. Steven has presented latest status of gear shift prescription (refer WLTP-DHC-16-03).

→ Validation 2 test indicated that this gear shift logic works well and no major concern was observed. Based on comments provided from participant laboratories, continue to work for improvement, then provide final version before starting confirmation testing.



## 6. Open Issues -1

### Cycle Development (a)

	Issues	Discussion points	Status
1	Deadline for submission of driving data	a) India and China requested deadline be extended to May	Decided to start development of new cycle after 8 <sup>th</sup> DHC meeting. Later data submission is still open for analysis.
2	Regional Weighting when developing the WLTC	a) traffic volume b) same weighting c) compromised weighting	It was agreed to adopt the traffic volume ratio during the 8 <sup>th</sup> DHC meeting
3	Threshold Speed for L/M/H	a) according to DHC-06-03 b) CP's requirement	No threshold speed is applied
4	High Phase Cycle Construction (US&EU versus other regions)	a) only ONE unified cycle b) possess TWO types of High phase cycle	It was agreed to possess two (2) types of HIGH phase cycle during 7 <sup>th</sup> meeting.
5	Mode Construction	a) cold start test only b) cold start & hot soak start	Established Mode Construction Task Force (MCTF) for further discussion and agreed during 17 <sup>th</sup> DHC meeting in Tokyo..

## 6. Open Issues -2

### Cycle Development (b)

	Issues	Discussion points	Status
6	Weighting Factor for L/M/H/Ex-H Phase	a) harmonized weighting factors b) permit regional weighting factors	Adopt harmonized weighting factors in Phase I gtr <b>Region or CP(s) may introduce regional WF based on traffic analysis</b>
7	Gear Shift Points	a) fixed points b) based on vehicle specification c) others	Vehicle specific shift points (b) was provided for Validation 2. Still working on for improvement.
8	How to treat the vehicles which are not able to follow the prescribed cycle	a) continue to drive with wide-open-throttle b) exempt the Ex-H (or M&H) phase (s) c) others	Apply downscale method. (Need to finalize the calculation formula for downscale ratio)  (Ex-H exemption is per CP needs)
9	Check the driving profile based on the vehicle characteristic		Analyze the in-use data based on vehicle characteristic (i.e. power to mass ratio)

# 6. Open Issues -3

## Mode Construction (a)

OI L#	class	phase (s)	Points	how to close ?	Conclusions
1	all	-	Power to Mass ratio threshold of classification curb mass or test mass ?	will be discussed during 15th DHC meeting based on Mr. Steven/Japan further study	apply kurb mass basis
2	all	-	definition of battery power and BEV maximum speed	JPN proposal : 30 minutes maximum power for Battery / 30 minutes maximum speed for BEV	All electrified vehicles belong to Class3
3	all	-	need "HOT" start test or not no clear position from CP	technical aspect : what kinds of criteria need to be established political : need input form CPs	not apply "HOT" start test
4	all	-	in case "HOT" start test is required, need COLD/HOT weighting factor	US/JP : already possess EU/IN/KR : conduct survey	na
5	all	-	in case "HOT" start test is required, need to define intermediate soak time.	US : 10 min. JPN : completely hot condition others : NA	na
6	all	L and/or M	in case "HOT" start test is required, which phase(S) need to be driven for HOT test ?	Vali1 : L, M (no need for H and Ex-H) confirm based on vali.2 results	na
7	1	all	vehicle speed threshold of cycle allocation ->Equivalency of pollutants and CO2 value	need input mainly from India colleagues	
8	2	all	vehicle speed threshold of cycle allocation ->Equivalency of pollutants and CO2 value	need input mainly from India colleagues	
9	3	all	vehicle speed threshold of cycle allocation ->less than 120kph : provisionally accepted ->ex-H phase driving : 135 or 145 or other ideas	will be discussed during 16 <sup>th</sup> DHC meeting	Agreed during 16 <sup>th</sup> DHC meeting (refer documents DHC-16-02)

## 6. Open Issues -4

### Mode Construction (b)

OI L#	class	phase (s)	Points	how to close ?	Conclusions
10	2&3	Ex-High	Per CPs need, Ex-High phase driving is exempted. ->Equivalency of pollutants and CO2 value ->PM sampling ->Ki Factor (regeneration system)	JPN proposal : standalone test for Ex-High phase	Will discuss at later stage
11	2&3	Ex-High	Does low ambient temperature test require Ex-High phase driving or not ?	so far, no discussion is done	Will discuss during Phase II
12	all	all	how to treat the vehicles whose maximum speed is less than phase maximum speed ?	[10]% margin constant speed, scale down profile, wide open throttle operation, exemption, ,,,,	Apply downscale method
13	sampling strategy	all	PM : 1 filter sampling, however, need to consider OIL#7~10 other pollutants : reach phase sampling		PM : 1 for L~H, 1 for Ex-H, Others : each phase
14	BEV	all	separate each phase test for range measurement is a burden for laboratories	confirm shorten method(proposed by JPN) works or not (->during confirmation test or E-Lab. unique program ?) if not, conduct each phase test separately	1 for L+M 1 for L~ExH (or H)
15	OVC-HEV	all	separate each phase test for measurement is a huge burden for laboratories	if no concrete counter-proposal is available, conduct each phase test separately	1 for L+M 1 for L~ExH (or H)

Almost all open issues were successfully closed.

# 7. Technical Report

Development of a World-wide Worldwide harmonized  
Light-duty driving Test Cycle (WLTC)

~ Draft Technical Report ~

UN/ECE/WP.29/GRPE/WLTP-IG

DHC subgroup

XX.XX.2013

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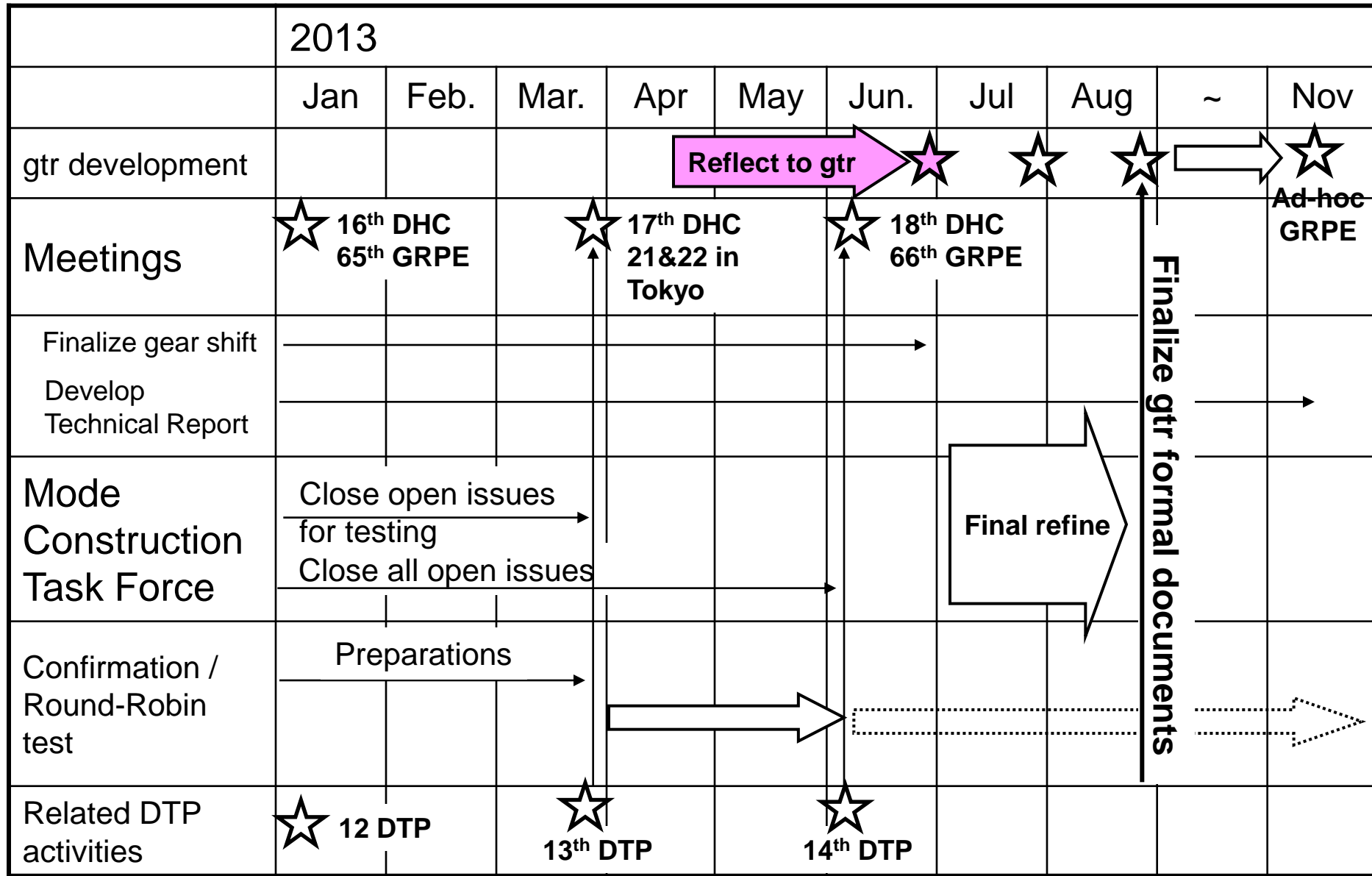
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Refer WLTP-DHC-18-06 for latest report.

Final report will be completed by next ad-hoc GRPE (Nov. 2013)

# 8. Next Actions



Thank you for all of your  
tremendous contributions  
on this difficult tasks !!!