

Update on subgroup activities for Part B

- Power Determination of Hybrid Electric Vehicles -

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- 1. Summary of Part B mandate**
- 2. ISO and SAE progress**
- 3. TS KATRI activity**
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Summary of Part B Mandate (1)

ECE-TRANS-WP.29-2016-116

Work Plan

I. Consideration of the concepts:

- Reference Method – Chassis dyno testing and calculation
- Candidate Method – Component testing and calculation

II. Consideration of the open points

- Load Collectives and Maximum Power
- Reference Method => Chassis Dyno Testing with completed vehicle and calculation to determine System Power
- Candidate Method => Component Testing and calculation to determine System Power
- Customer Information and other information with added value

III. Determination of work plan with task list and including allocation of work load

IV. Proof of concepts: Studies with different types of HEVs including series HEV, REX and PEVs

V. Test, refine / improve and validation of the method(s)

VI. Drafting of the gtr

VII. Proposal for a draft amendment to GTR No. 15

VIII. Approval at GRPE, voting at WP.29 AC.3

Summary of Part B Mandate (2)

ECE-TRANS-WP.29-2016-116

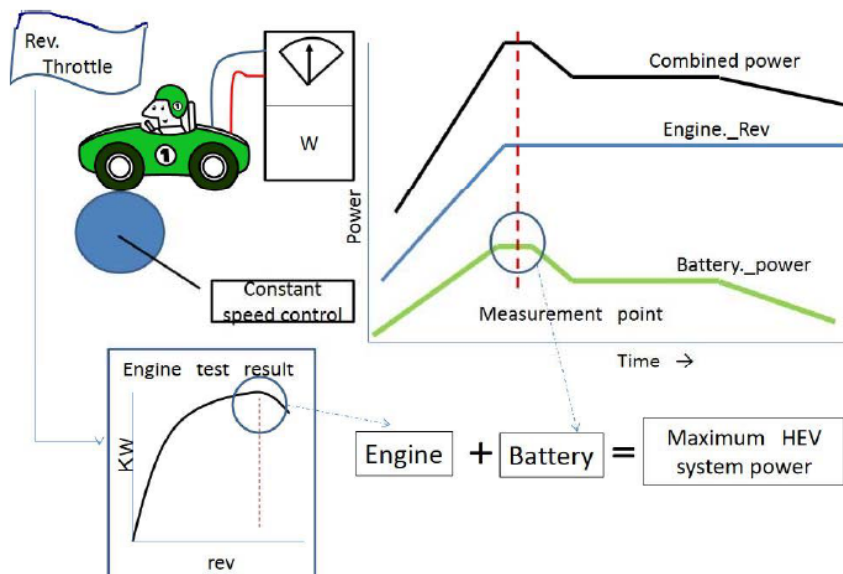
Timeline

- (i) November 2016: Approval of the authorization to develop an amendment to gtr No. 15 by AC.3;
- (ii) June 2018: Draft gtr available, guidance on any open issues by GRPE;
- (iii) June 2018-January 2019: Final drafting work on gtr text;
- (iv) January 2019:
 - a. Endorsement of the draft gtr based on an informal document by GRPE;
 - b. Transmission of the draft gtr as an official document twelve weeks before the June 2019 session of GRPE.
- (v) June 2019: Recommendation of the draft gtr by GRPE;
- (vi) November 2019: establishment of the gtr by AC.3 in the Global Registry.

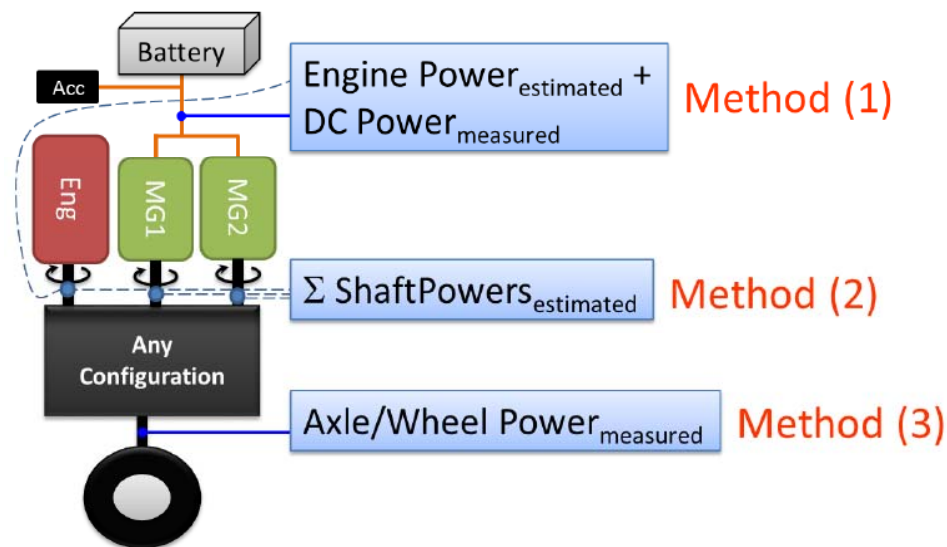
Note: Because this procedure may involve developing a candidate method (based on component testing) which must be validated against a reference method (based on chassis dyno testing), the EVE IWG is also asking AC.3 to allow up to 1 extra year beyond the timelines above for gtr development, if initial validation testing of the candidate method proves promising, and more time is needed to fully validate the candidate method.

ISO and SAE Method

ISO /CD 20762



SAE J2908



Japan method (TP1)

- HEV system power = engine net power + (RESS measured power – power to DCDC converter) X (conversion efficiency from electrical power to mechanical power)

Germany method (TP2)

- HEV system power = $\frac{\text{(HEV system power value at axle/wheel)}}{\text{(gearbox system efficiency factor)}}$

Method (1)

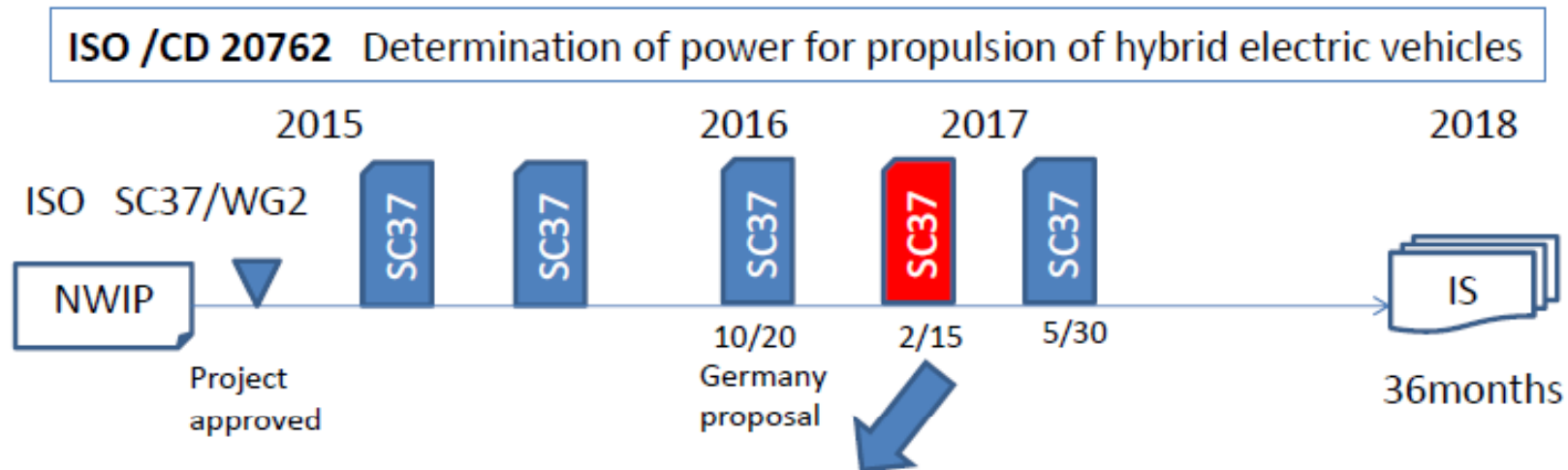
- HEV system power = Engine power + DC power

Method (3)

- Based upon hub dyno or chassis dyno measurement
- Accurate determination of axle or wheel power
- Highly verifiable results

ISO progress

EVE-22-03e_Report on activity of ISO working group



WG 2 agreed on that the test procedure 1 (Japan method) and 2 (Germany method) would be combined and that the draft reflecting the results will be balloted as a CD.

CD voting from 9.Mar. to 5.May 2017

May Meeting : WG will propose the DIS vote

DIS Voting from Jun to Nov. 2017

EVE will be able to refer the document which will be published by ISO in Nov. 2017.

NWIP : New Work Item Proposal , CD: Committee Draft ,
DIS: Draft International Standard , IS : International Standard

❖ SAE J2908_draft summary

Power definition

- Power = direct measurement of wheel, hub, or axle power
- SAE will accommodate 2 power durations:
 - 1) peak from 2s moving window average
 - 2) 2s average from 8-10 seconds after maximum acceleration pedal position is given

Prep Procedure

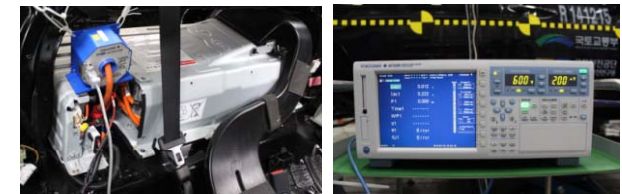
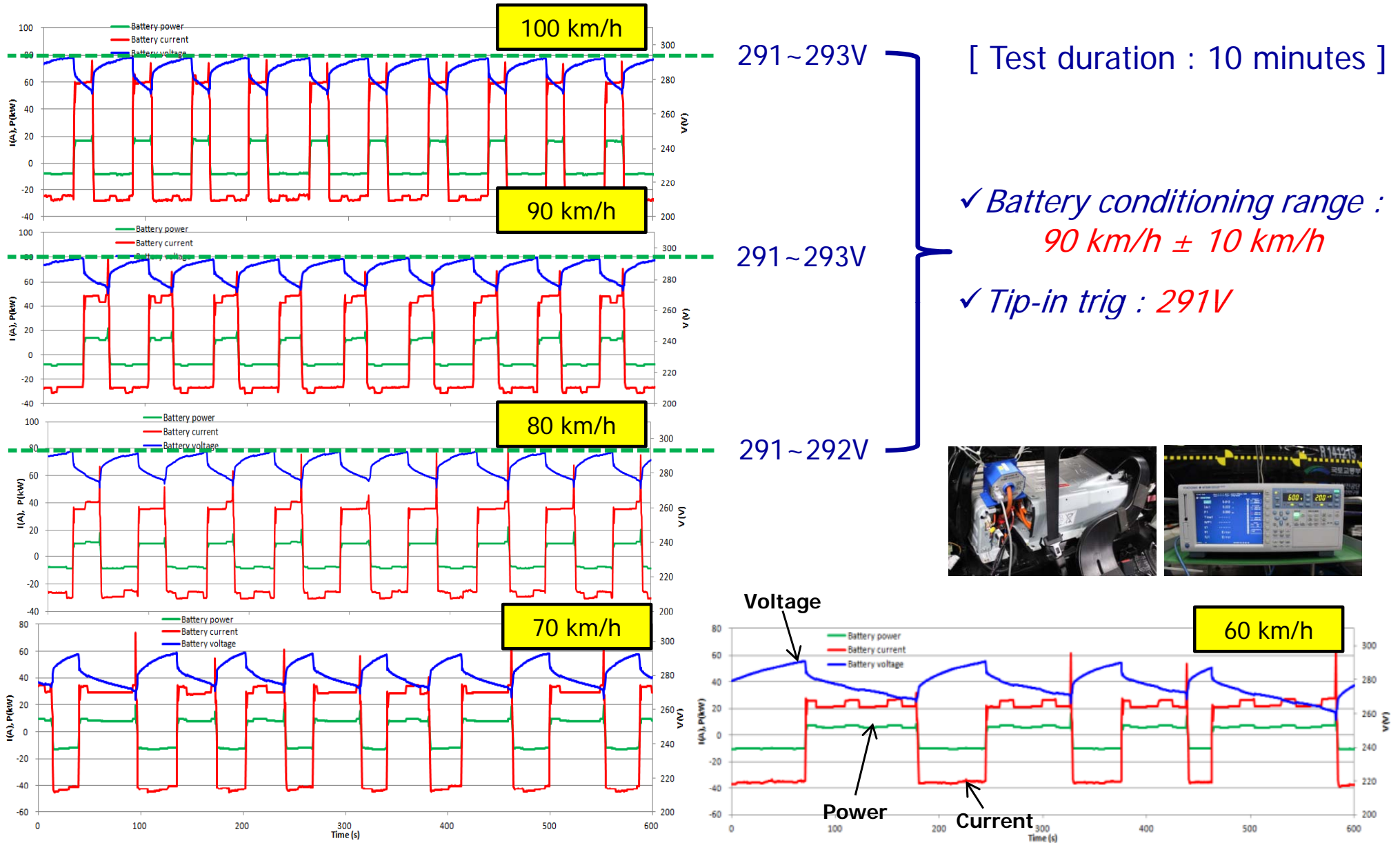
- HEV prep = 10-15 minutes at 100 km/h, observe SOC, continue until thermal stability
- PHEV prep = start at full charge, aggressively accel to invoke engine start,
continue driving for 16.6 km
- BEV and electric-only PHEV in CD mode = start at full charge, 100 km/h for 10 min

Test Procedure

- Optional power sweep test conducted to find V_{mp} , (V_{mp} = vehicle speed where maximum power is found)
- Run at target SOC (SOC after prep), adjust dyno speed to V_{mp} ,
press accelerator to 100% for 10-15s.

TS KATRI activity [Battery conditioning]

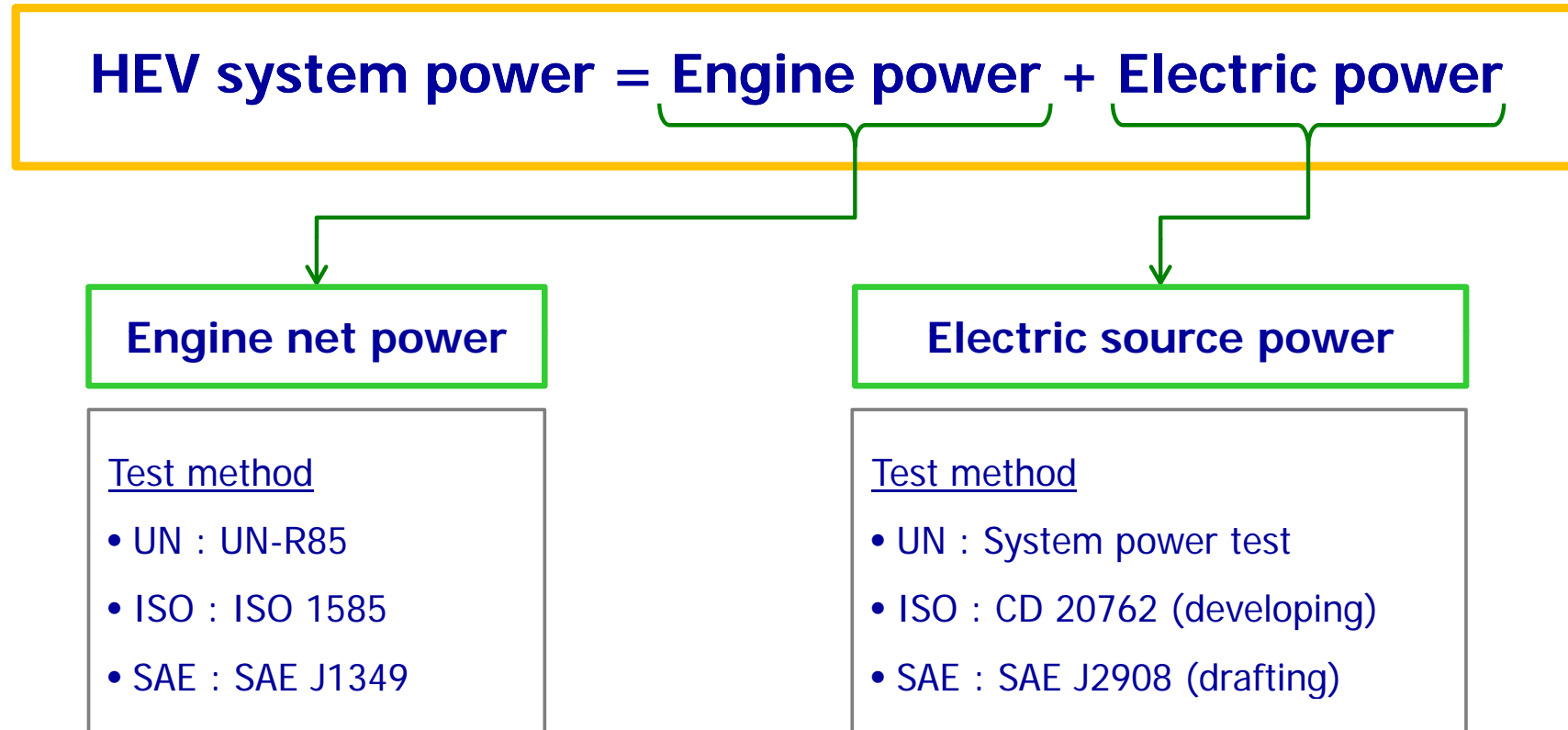
❖ Parallel HEV



Summary of Part A work

Informal document WP.29-170-31

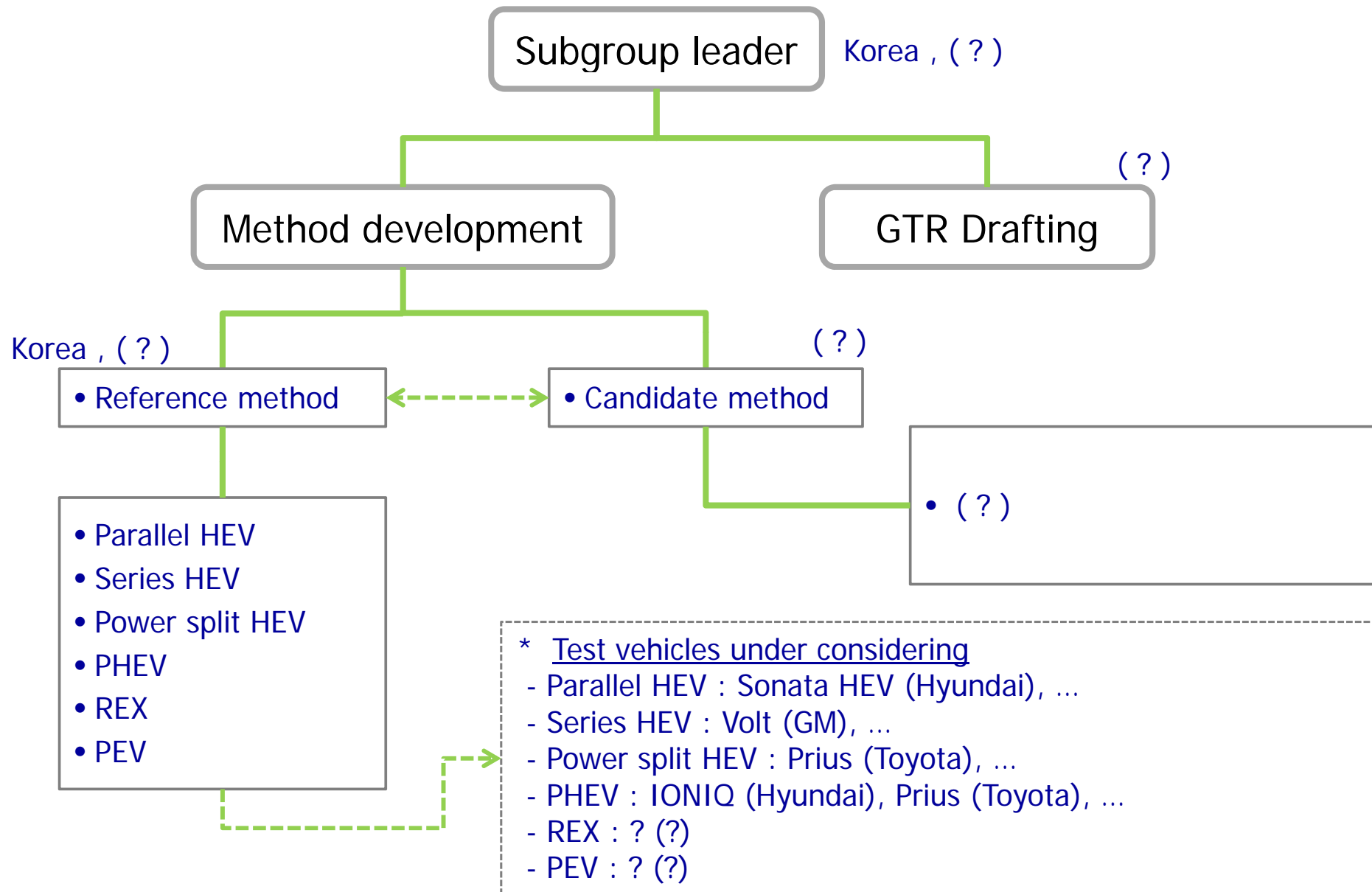
❖ Definition of the HEV system power



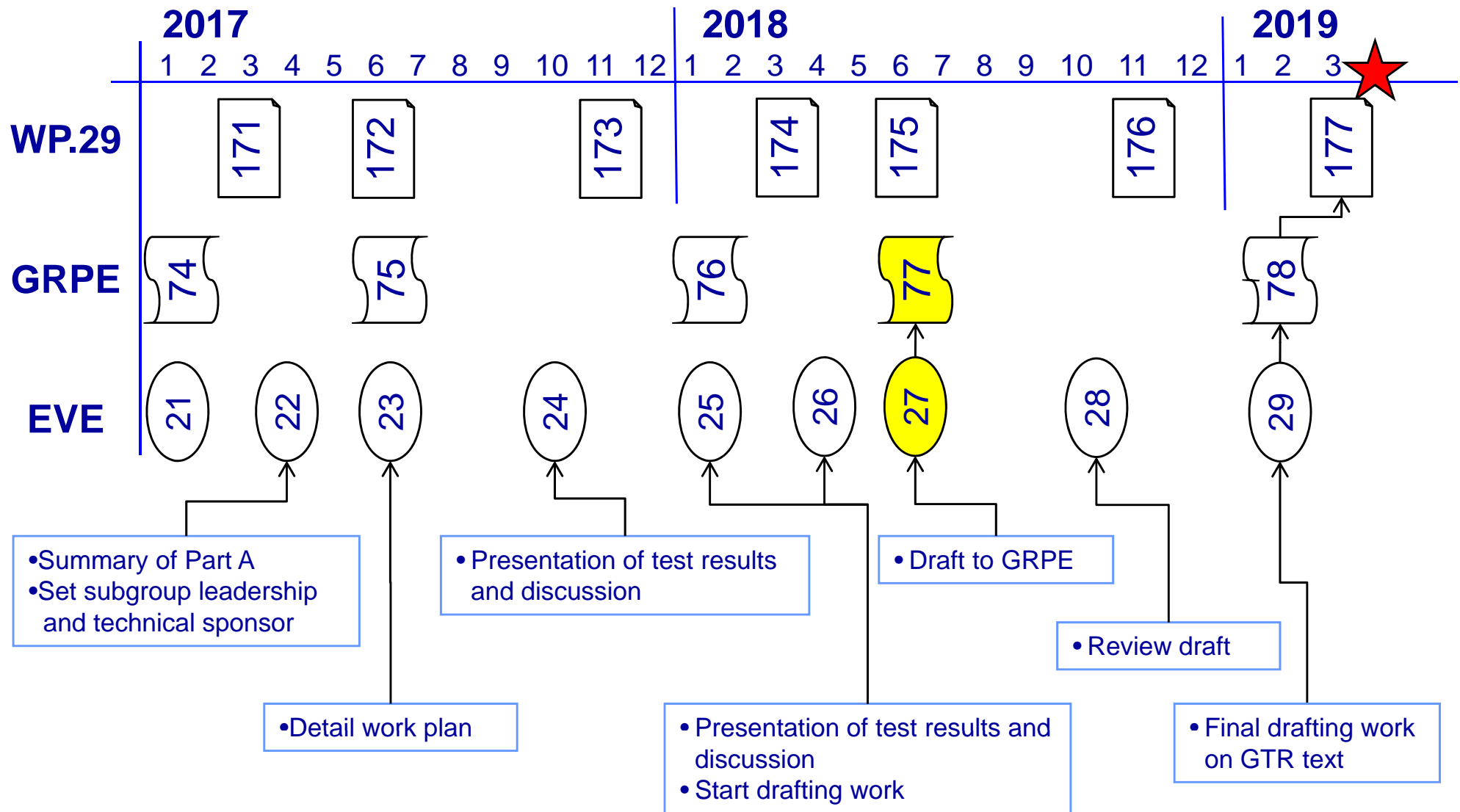
❖ Objects : NOVC-HEV and OVC-HEV in light duty vehicles (M1 & N1)

* NOVC : Not Off-Vehicle Charge, OVC : Off-Vehicle Charge

How to set subgroup organization



Schedule for Part B work



Thank you !

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