Working Paper No. HDH-07-10
(7th HDH meeting, 12 to 14 October 2011)

Confirmation of Japan understanding of application concept of WHTC for HILS in HDH-07-05

October 13, 2011

1. WHTC defines motoring torque of ICE as braking side.

=> Motoring torque shall be replaced by appropriate recuperating power calculated on WHVC on flat condition with some vehicle data, i.e. tire, diff, TM and air/rolling resistance, etc.
Detailed replacing method will be studied.

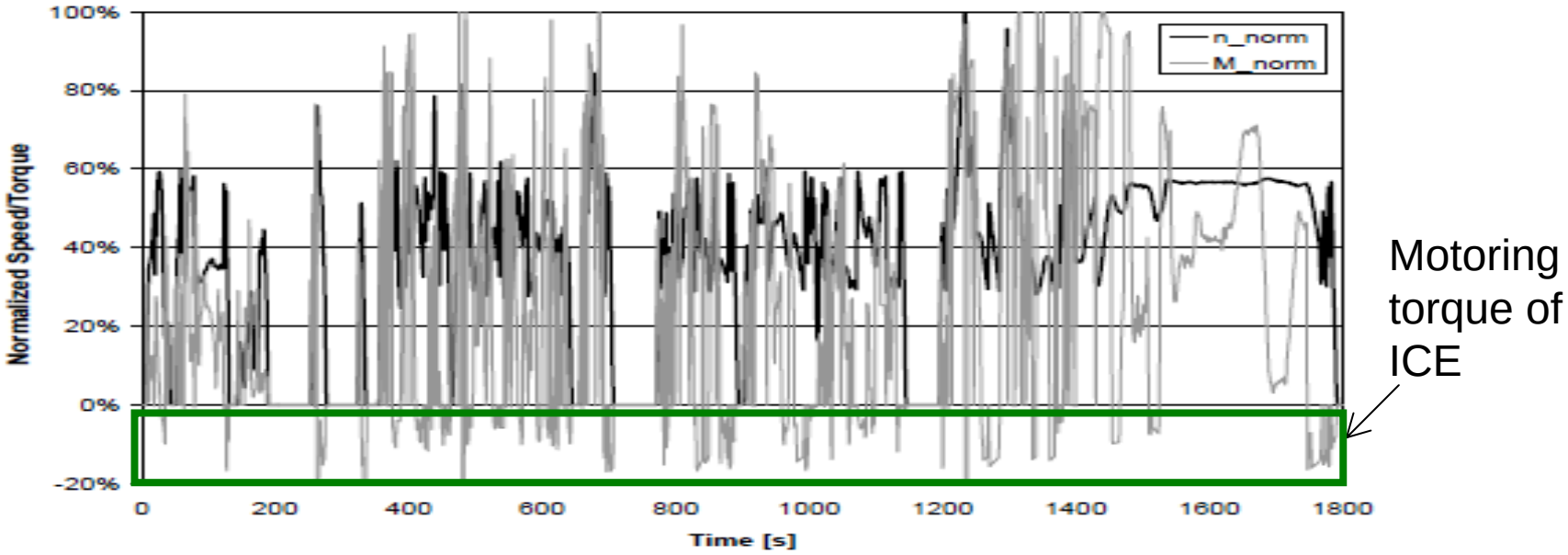

Fig.1 WHTC normalized speed/torque source: GRPE/WHDC/FE31('09.6)

2. Series hybrid shall be applied with WHTC normalized speed/torque method as well.

=> Japan is afraid of the deviation from the actual vehicle behavior

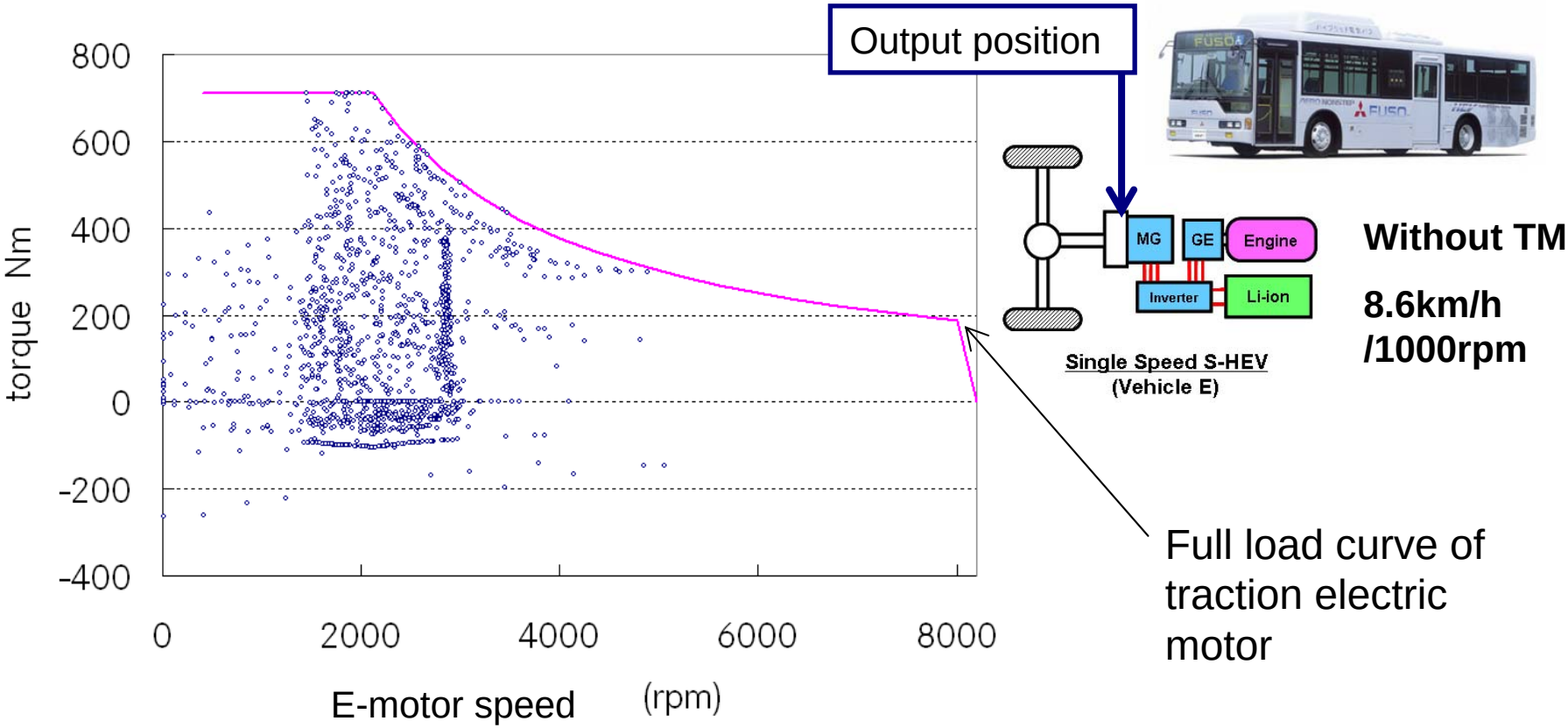

Fig.2 an example of application result of WHTC for series hybrid traction e-motor

3. In case of HILS vehicle model and vehicle speed profile is needed because of using “actual hybrid control unit”.
=> input speed/torque profile at tire is considered to be specialized for each power pack system
to achieve WHTC speed/torque at the output position.
Detailed method will be studied.

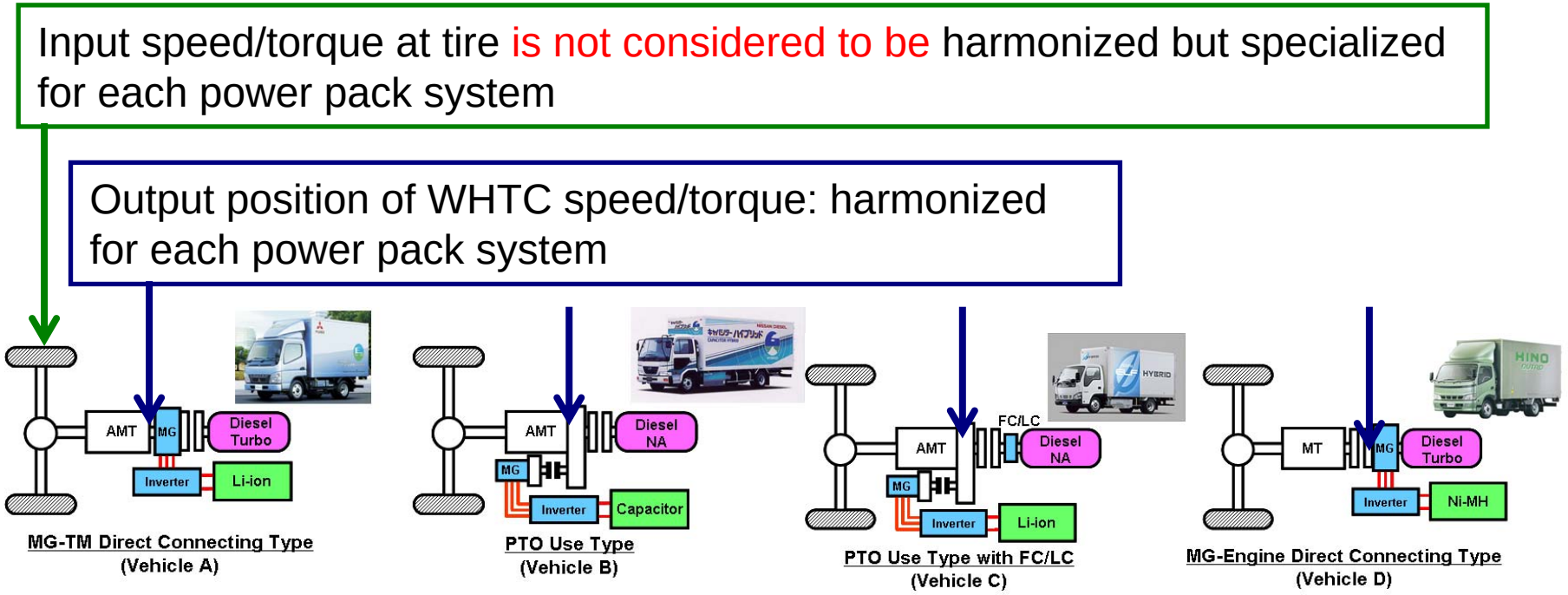

Fig.3 output position of WHTC speed/torque in case of Japan current parallel hybrid

APPENDIX

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page 28～29

7.6.1. Denormalization of engine speed

The speed shall be denormalized using the following equation:

Actual speed = nnorm x (0.45 x nlo + 0.45 x npref + 0.1 x nhi − nidle) x 2.0327 + nidle (4)

where:

nlo is the lowest speed where the power is 55 per cent of maximum power

npref is the engine speed where the max. torque integral is 51 per cent of the whole integral

nhi is the highest speed where the power is 70 per cent of maximum power.

nidle is the idle speed

as shown in figure 4.

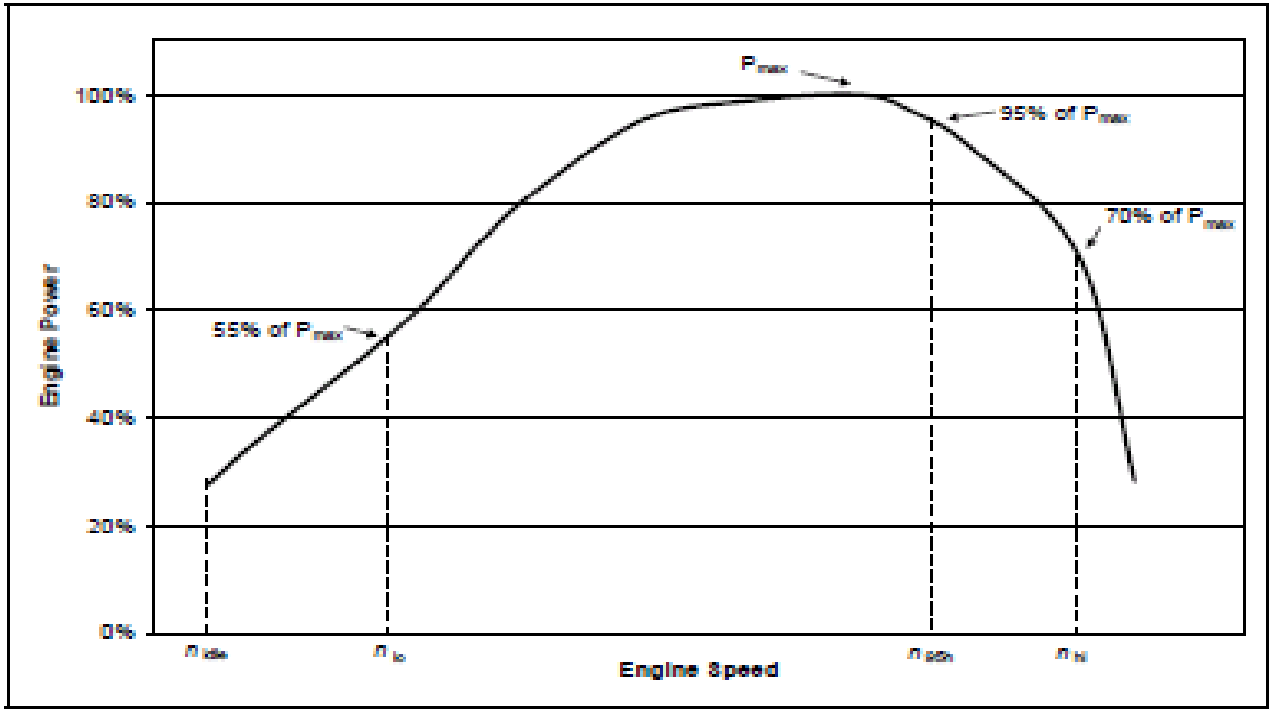

Figure 4:
Definition of test speeds