

Japan Comments for Battery Durability GTR EVE43

3. February.2021

Battery Performance Requirements : proposed MPR @ EVE 41 using the TEMA model

BEV:

[80] % after 100.000 km and 5 years

[70] %after 160.000 km and 8 years

PHEV:

[90] % after 100.000 km and 5 years

[80] % after 160.000 km and 8 years

Re-posted for Reminder

<Japan Comments at EVE42>

(1) The followings were new elements added at EVE 41.

i) Geo-tab data was shown.

ii) Part B decision was changed to “Backstop concept” from” Fleet average.”

iii) The treatment of reserve was proposed;

(2) Japan requests to provide information regarding Geo-Tab data, in the concrete analysis of information related to battery degradation, such as the battery temperature information, SOC distribution, and battery input/output power distribution. These information is considered to be an important factor in determining MPR, including the Backstop concept.

(3) In order to evaluate the degradation of the battery, it should be compared under non-reserve conditions.

If the reserves are separated for PEVs and PHEVs, the concept of reserve should be clearly presented in terms of CO2 impact, user benefits, etc. Larger reserve values leading higher MPR have disadvantages such as increased battery weight and decreased lifetime EV range.

Therefore, Japan at this moment has a doubt “assumption which there is always reserve” can appropriately address the purpose of eliminating substandard batteries. It would be alternative ideas that reserve is not be used for setting MPR, or that, if higher MPR values are selected in anticipation of “there is basically reserve”, user benefits rather than merely checking battery degradation and the effect on total CO2 performance should be considered.

(4) Japan expects that IWG continues discussion on these.

Battery Performance Requirements

Re-posted for Reminder

The CPs shall define Minimum Performance Requirements (MPR_i) for both certified battery energy and certified range for batteries installed inside a vehicle. Vehicles falling under the categories of OVC-HEVs and PEVs shall meet the Minimum Performance Requirements in Tables 1 and 2 below. The MPRs may differ depending on the type of vehicle and propulsion.

<Japan Comment at EVE42> :

Japan understands that this table doesn't mean CPs need to define both 5- and 8-year MPR and that CPs may exempt the one of the useful life requirements.

In addition, Japan believes "5- and 8-years" here means each maximum period (harmonic consideration), e.g., MPR values for 8-years can be used at 7 years, according to inspection periods in each CP.

Table 1: Battery Energy based MPR

Passenger cars	OVC-HEV	PEV
5 years or 100.000 km, whichever comes first	[90%]	[80%]
8 years or 160.000 km, whichever comes first	[80%]	[70%]

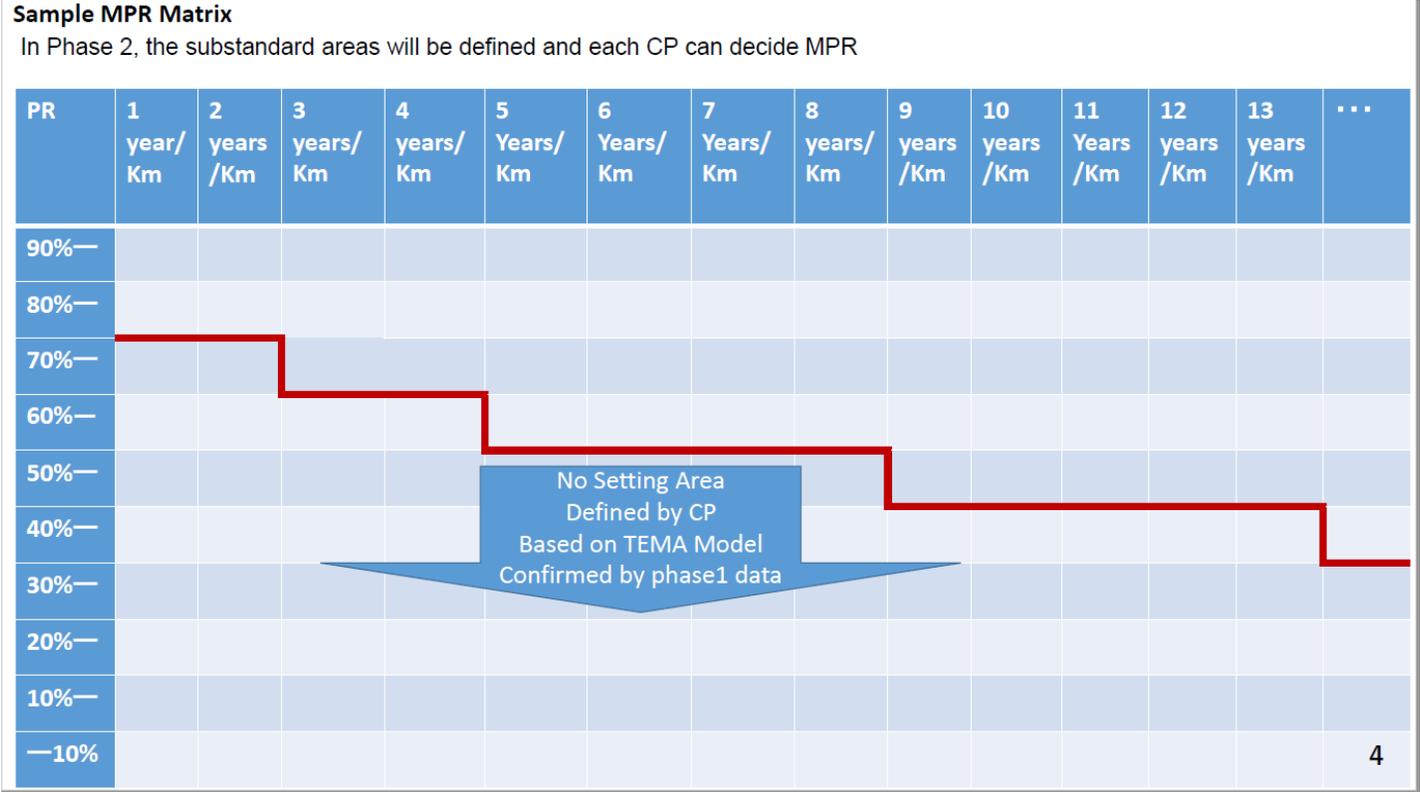
MPR Matrix Concept

<Japan Comment at EVE42>

Re-posted for Reminder

This was proposed by Japan in the EVE40 (EVE 40 -03e) for phase 2.

add a "placeholder" Annex 2, titled "RESERVED: Annex X/MPR matrix", containing text.] such as
[In Phase 2, the substandard areas will be defined and each CP can decide MPR]



This proposal was not included in the Draft of GTR for Phase1 with the following comments which were added after the last IWG. However, Japan is also proposing this concept from the point of view of the harmonisation (see P7, 8, 9, 10).

There is no need for an Annex, since the sentence above Table 2 states that the values shall be monitored to inform the 2nd phase. But we should definitely not add that each CP can decide MPRs. This would be against harmonisation.

Part B Criteria :

Max. [5%] of all measured vehicles are allowed to be below the MPR level
(backstop criterion in Phase 1 only)

If below [5%], then it is a Part B pass.

Minimum number of vehicles: 500;

if less than 500, extreme vehicles should be excluded by vehicle survey.

< Japan Comments @EVE42 >

As a matter of concern, the distribution on the lower side of the SOCE includes a large number of severely used vehicles.

Need to discuss NUI, which was concluded that Fleet Average judgement does not need NUI.

Japan would like to ask or confirm the following points.

- 1. Did you add this condition for the case where less than 500 units of the vehicle of the same battery durability family will be sold?**
- 2. Is it correct that the vehicle survey will not be conducted for more than 500 units?**
- 3. How to deal with survey in case of OTA data collection?**

1. Japan positions in response to the comments at EVE 42

1. Request to provide geo-tab data, as it is an important factor to consider MPR and Backstop.

Japan has already accessed and analyzed the publicly available Geo-Tab data.

Since Japanese proposal is available, Japan will withdraw our request for detailed data which Japan raised at the last IWG.

2. How to deal with “reserve” in the MPR proposal.

The MPR decision was based solely on the TEMA model (“Reserve” is an input), which raised concerns.

(1) The EU-US-Canada joint proposal is not limited to the TEMA model, but is comprehensively proposed taking into account Geo-Tab data and Warranty information.

(2) The reserve is one of the design factors and is not a factor for determining MPR.

For these reasons, it is judged that there is no need to discuss the reserve any more.

3. Selection of 5- and 8-year for MPR

There is no change from the previous position that the CP should be able to choose either (1) five years or (2) five to eight years, taking into account the frequency of its automobile inspection system.

Japan will propose GTR text at P7

4. MPR Matrix concept

(1) Japan agreed that MPR Matrix is not included in GTR text in Phase 1 .

(2) Japan propose the points to be included in Technical Report for Phase 2 . (see P.8,9,10)

5. How to consider NUI when adopting the Backstop concept

The current GTR draft discussion does not cover how to collect data for considering NUI in Phase 1.

We propose to consider the means of obtaining data for discussion in Phase 2.

2. MPR Text for phase 1

< Japan Comment >

Japan understand that at the last IWG it was stated that the CPs which adopt this GTR shall comply with both MPRs for 5 years and 8 years (at that time) in the Table 1.

However, from the point of view that there are different legal systems for in-service conformity in the world, it should be appropriate that CPs which adopt this GTR can select MPRs considering their domestic legal system for in-service conformity.

In this regards, Japanese proposal for the text on "Battery Performance Requirements" for Phase 1 is as follows. Japan made this proposal based on some texts for "performance requirements" in other GTRs.

< Japanese proposal >

5.2 Battery Performance Requirements

The Minimum Performance Requirements(MPR_i) for both certified battery energy and certified range for batteries installed inside a vehicle are set out at Table1 and 2 below. Vehicles falling under the categories of OVC-HEVs and PEVs shall meet the MPR_i. During a first phase, both for passenger cars and vans, the CPs may accept compliance with one or two of the MPR_i from Table 1.

< Current draft text >

5.2. Battery Performance Requirements ↵

The CPs shall define Minimum Performance Requirements (MPR_i) for both certified battery energy and certified range for batteries installed inside a vehicle. Vehicles falling under the categories of OVC-HEVs and PEVs shall meet both of the Minimum Performance Requirements in Tables 1 and 2 below. The MPRs may differ depending on the type of vehicle and propulsion. ↵

Table 1: Battery Energy based MPR ↵

Passenger cars ↵	OVC-HEV ↵	PEV ↵
5 years or 100,000 km, whichever comes first ↵	[90%] ↵	[80%] ↵
Vehicles between 5 years/100,000 km and 8 years or 160,000 km, whichever comes first ↵	[80%] ↵	[70%] ↵

⊕ ↵

Vans ↵	OVC-HEV ↵	PEV ↵
5 years or 100,000 km, whichever comes first ↵	[90%] ↵	[80%] ↵
Vehicles between 5 years/100,000 km and 8 years or 160,000 km, whichever comes first ↵	[80%] ↵	[70%] ↵

3.Points to be Described in the Phase 1 GTR Technical Report for Phase 2

I. Statement of technical rationale and justification

- A. Introduction [To be prepared]
- B. Procedural background [To be prepared]

II. Text of the GTR

1.Purpose

This Global Technical Regulation provides a worldwide harmonized method to set and verify minimum performance requirement on in-vehicle battery durability of PEV and OVC-HEVs.

2.Scope and application

This UN GTR applies to PEV and OVC-HEV vehicles of categories 1-2 and 2, both having a technically permissible maximum laden mass not exceeding 3,500 kg, and to all vehicles of category 1-1.

<Japan Comments >

As noted above, the Phase 1 GTR technical report "**I. Statement of technical rationale and justification**" to be prepared should include at least the followings:.

1) The reason for the selection of the MPR value for Phase 1 should be clearly stated.

It should be mentioned that CPs that would adopt GTR in the future can also select the MPR according to their needs based on the concept of harmonization, as described on page 9, by referring to the contents of the Technical Report.

Furthermore, in Phase 2, it should be mentioned that based on the data collected by the unified evaluation method in Phase 1 and data from many countries and regions, it is expected to be possible to develop substandard lines corresponding to mileage and years as shown in page 10, and MPRs more appropriate for the market in each country and region.

(See P 9, 10)

2) Concept or discussion of Family Definition

Proposal for Description in Technical Report: Validity of CP Option in MPR for Battery Durability

- Different markets and applications may require different performance and priorities.

Example)

Mileage (Annual / per 1 charge), vehicle speed, age of use, charging environment (Quick charge diffusion rate, usage frequency), frequency of V2X use, ambient temperature, etc., and Price Acceptability

- Based on the data collected by the unified evaluation method in Phase 1 and data from many countries and regions, it is expected that it will be possible to develop substandard battery criteria according to mileage and years, and more appropriate MPR for the market in each country.
 - It is considered that the information from CPs which do not currently participate in the EVE discussions is also indispensable.
 - This concept can respond to the needs of various regions and different ways of using electric vehicles.
 - Fully harmonized measurement methods should be agreed upon worldwide, and the regulated values should be chosen from a harmonized range, taking into account the CP situation described above.
- Considering the spread of electric vehicles on a global scale, GTR with uniform standard values should not deprive the right of CP and the users in the world to choose vehicles.

<Excerpt from 1998 Agreement>

4.2. A global technical regulation may specify alternative non-global levels of stringency or performance, and appropriate test procedures, where needed to facilitate the regulatory activities of certain countries, in particular developing countries.

Suggested Statement in Technical Report: Example of MPR Expression Considering CP Situation

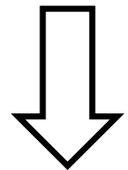
1. For Phase 2.
2. Based on the data collected by the unified evaluation method in Phase 1, and data from many countries and regions, it is expected that it will be possible to develop additional substandard battery criteria according to mileage and years, and.
3. Considering that the situation varies by country or region, CPs can select appropriate MPR for their specific market, as long as they are above the substandard battery criteria line.



4 . Proposal for MPR and Backstop

Based on the intensive discussions during EVE IWG and internal meeting,
Japan supports

- (1) “BACKSTOP” concept and
- (2) to determine the Phase I MPRs according to the currently available data and information



JAPAN PROPOSALS based on our analysis (see P12 - 15)

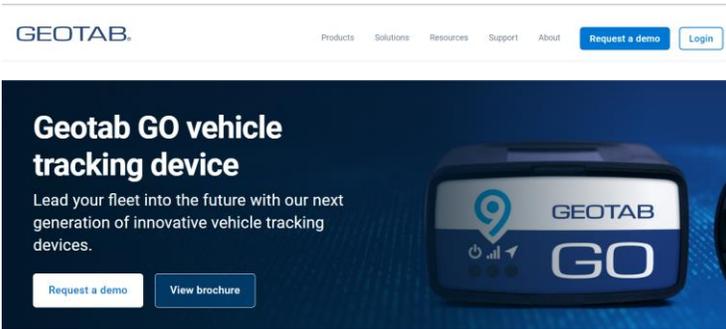
		PEV		OVC-HEV(PHEV)	
		5yrs/ 100K km	8yrs/160K km	5yrs/ 100K km	8yrs/160K km
SOCE	MPRs	80 (←)	70 (←)	80 (90)	70 (80)
	Backstop	10 (5)			
SOSR	MPRs	Monitoring (←)			
	Backstop				

() : proposals by EC/USEPA/ECCC

4-1. Analysis on one of Currently Available Data (GEOTAB)

publically available

@ <https://www.geotab.com/>

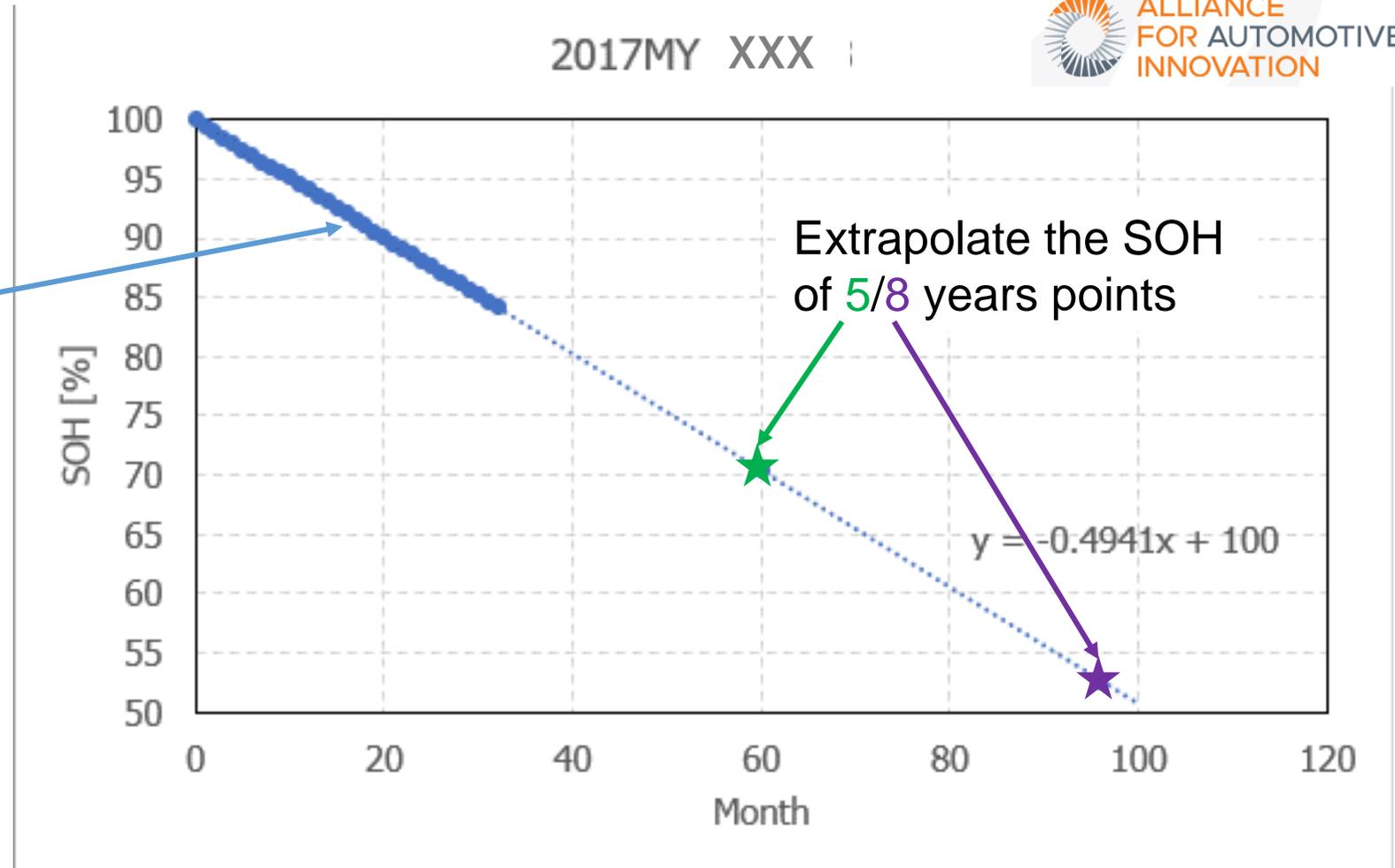


notes)

- ✓ For PEV, 35 models with average 32 months old (only 4 models older than 5yrs)
- ✓ For PHEV, 29 models with average 30 months old (only 1 model older than 5yrs)
- ✓ Calculate per each MY and each Model (not per battery durability family)
- ✓ sales volume of each MY and model is NOT reflected

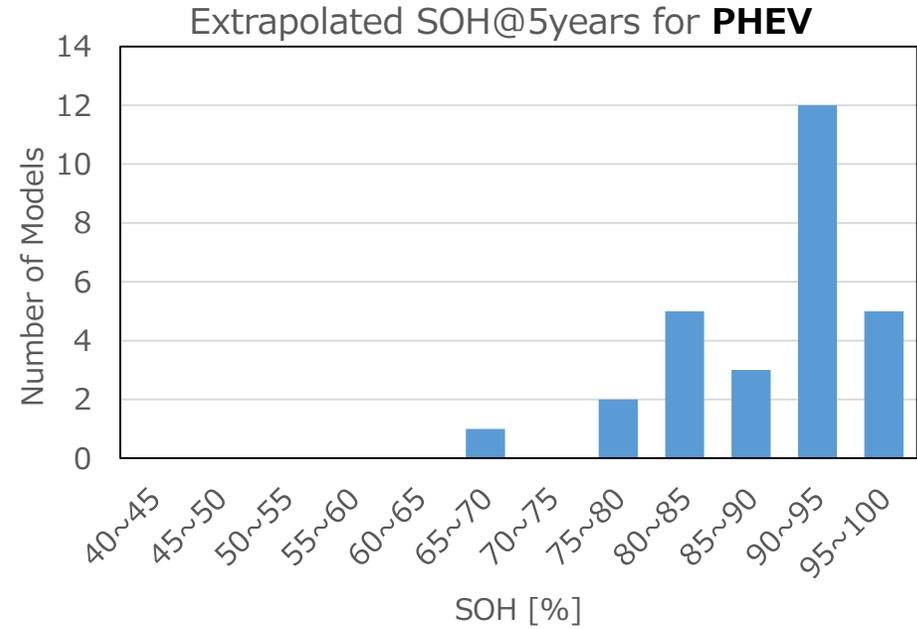
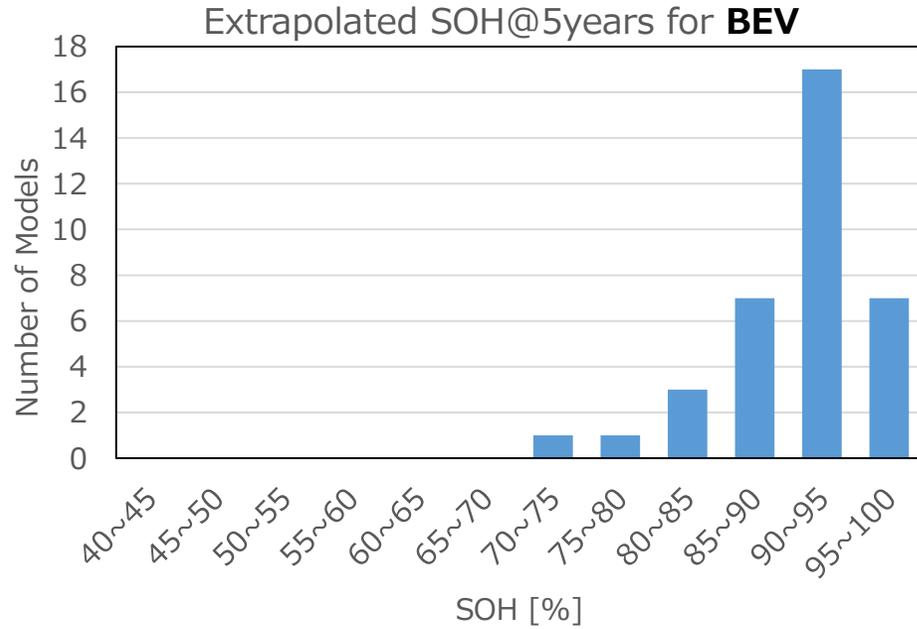
Analysis Method*

*) originally initiated by

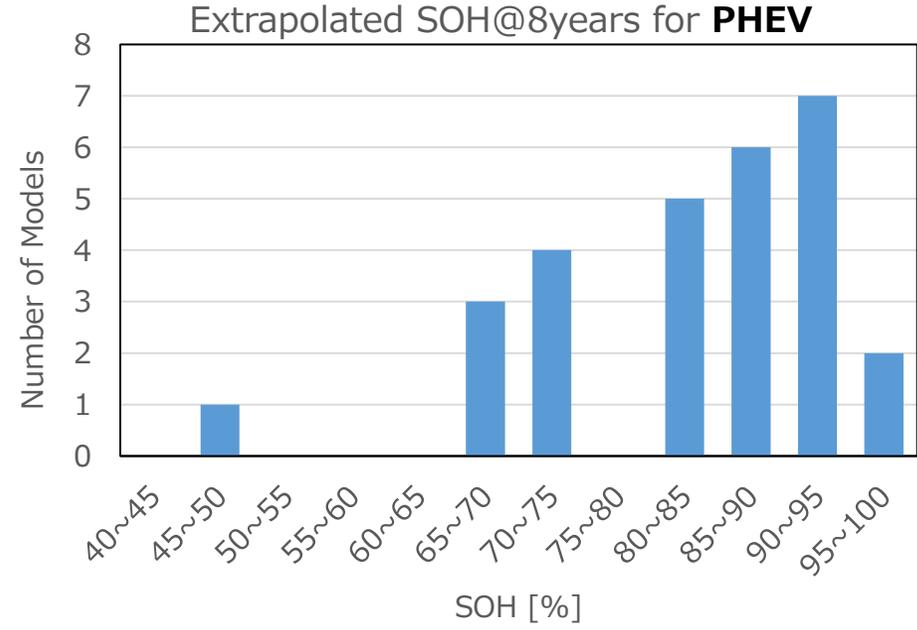
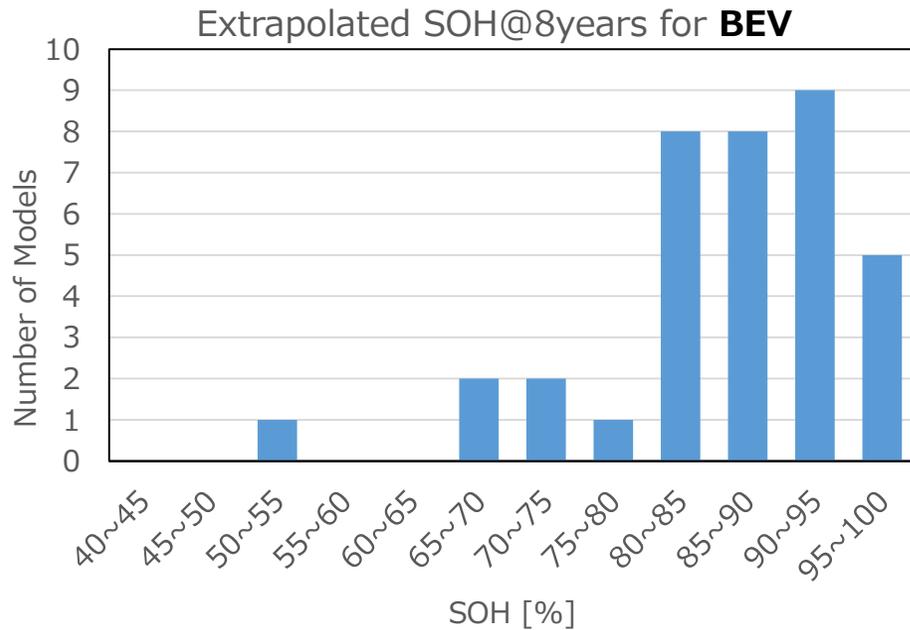


4-2 SOH distribution at 5 and 8 years by Extrapolation

5 years



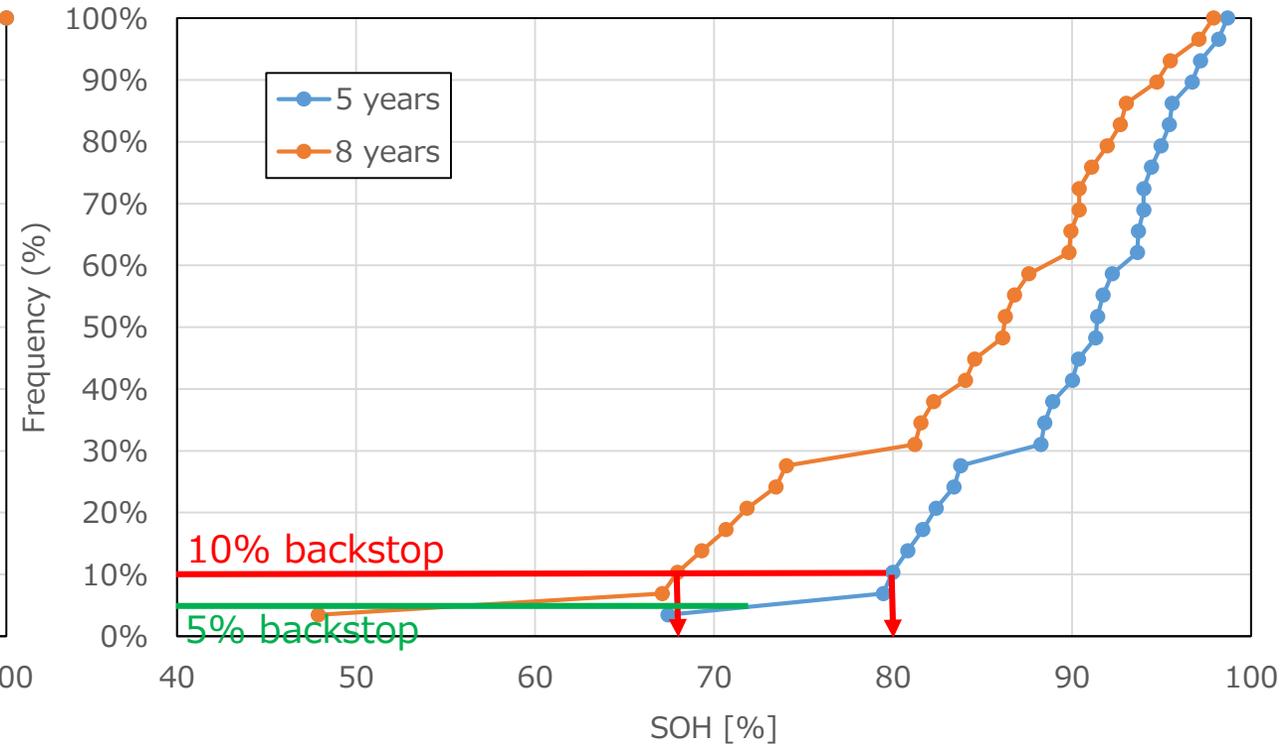
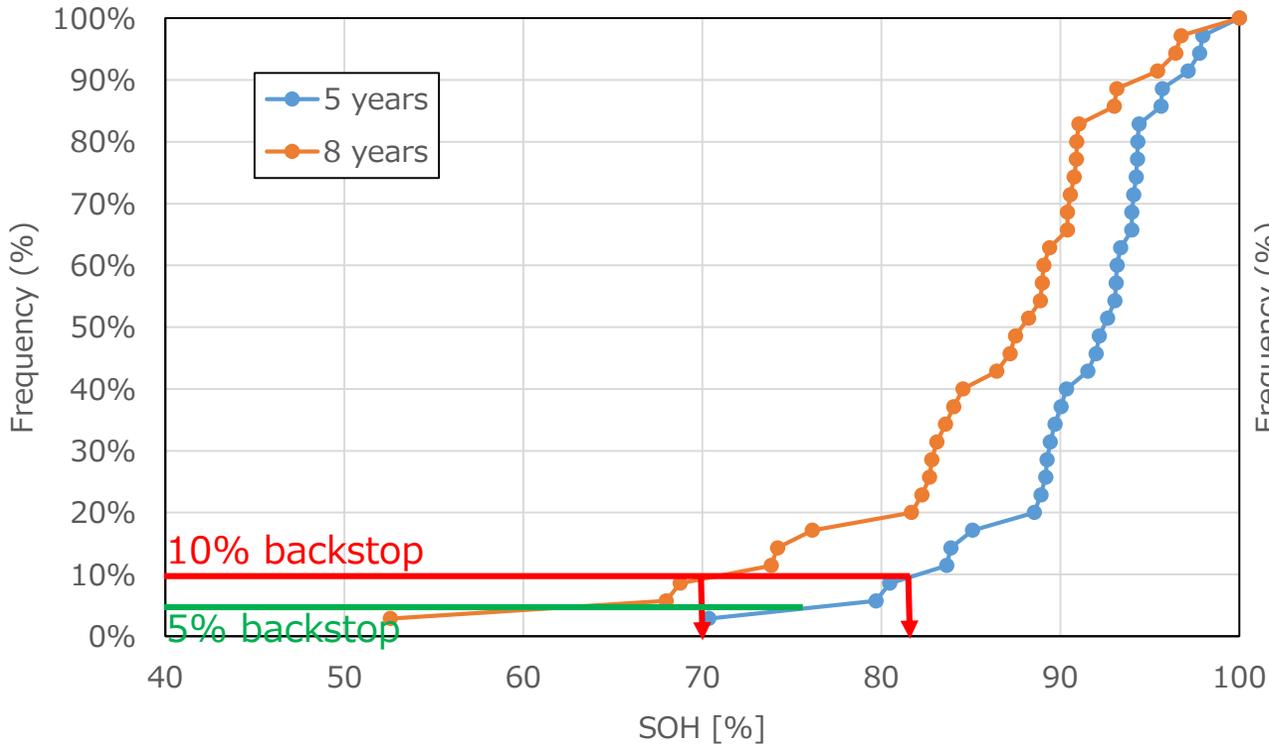
8 years



4-3 SOH cumulative frequency at 5 and 8 years

Cumulative frequency for **BEV**

Cumulative frequency for **PHEV**



Analysis indicates

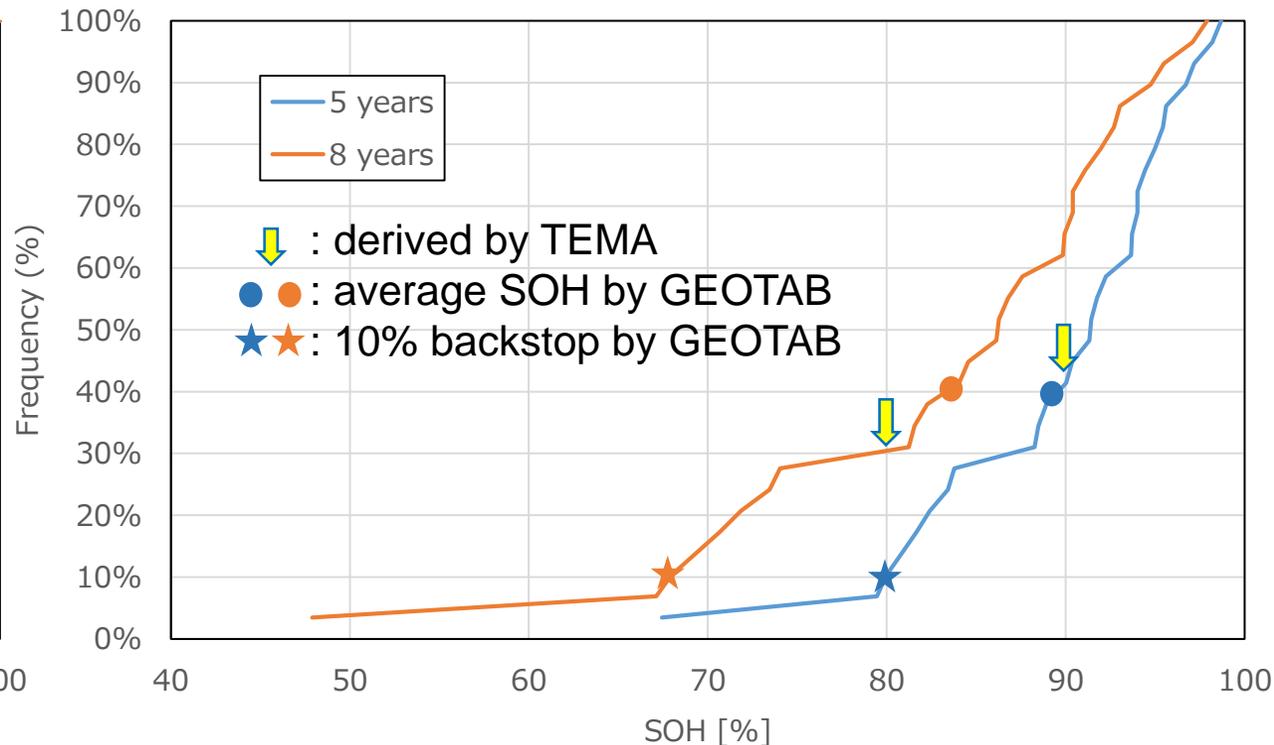
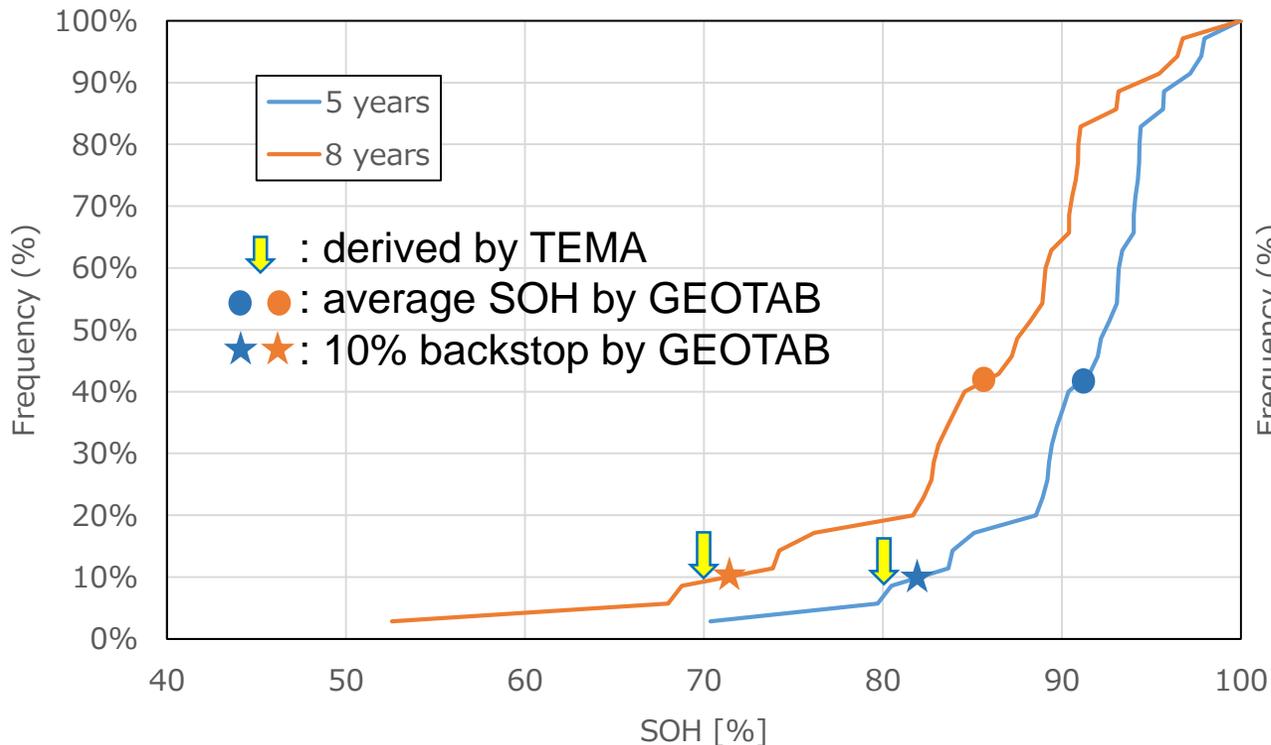
- ✓ MPRs based 5% backstop may lead false pass/fail decision → **propose 10% backstop**
- ✓ MPRs based 10% backstop are going to be approximately

80%@5yrs / 70%@8yrs for both PEV and PHEV

4-4 Comparison between TEMA model and GEOTAB data

Cumulative frequency for BEV

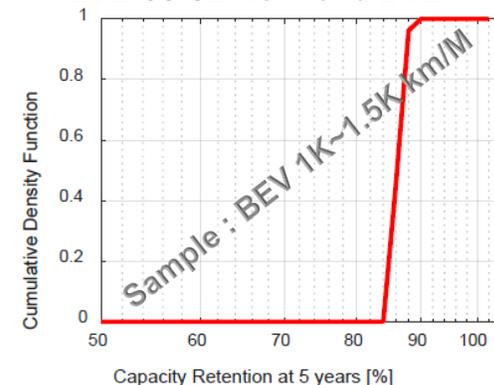
Cumulative frequency for PHEV



	PEV				PHEV			
	5yrs		8yrs		5yrs		8yrs	
	TEMA	GEOTAB	TEMA	GEOTAB	TEMA	GEOTAB	TEMA	GEOTAB
Fleet	80%	91%	70%	86%	90%	90%	80%	83%
Backstop*	80%	82%	70%	71%	90%	80%	80%	68%

* : 5% in case of TEMA, 10% in case of GEOTAB

TEMA data comes from EVE-38-02-Rev1 and EVE-41-03



END