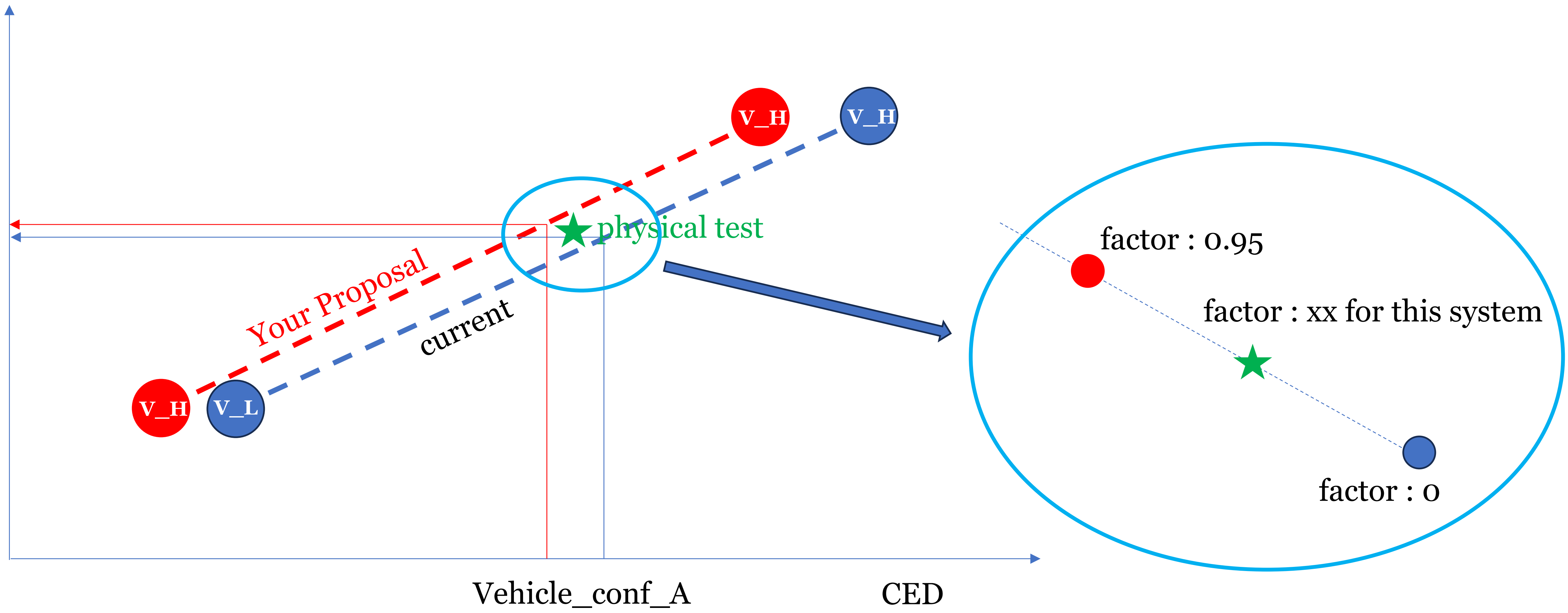
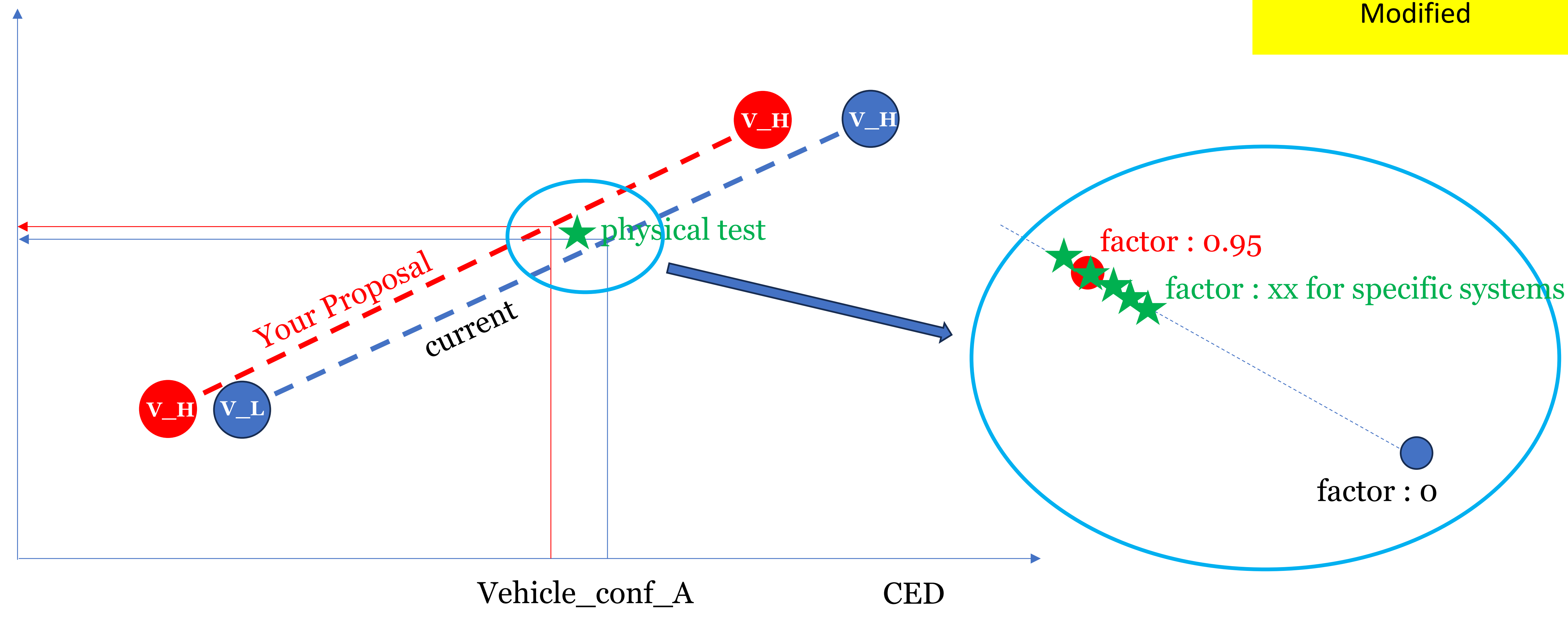
Discussion Paper on consideration of “Recuperation Energy”

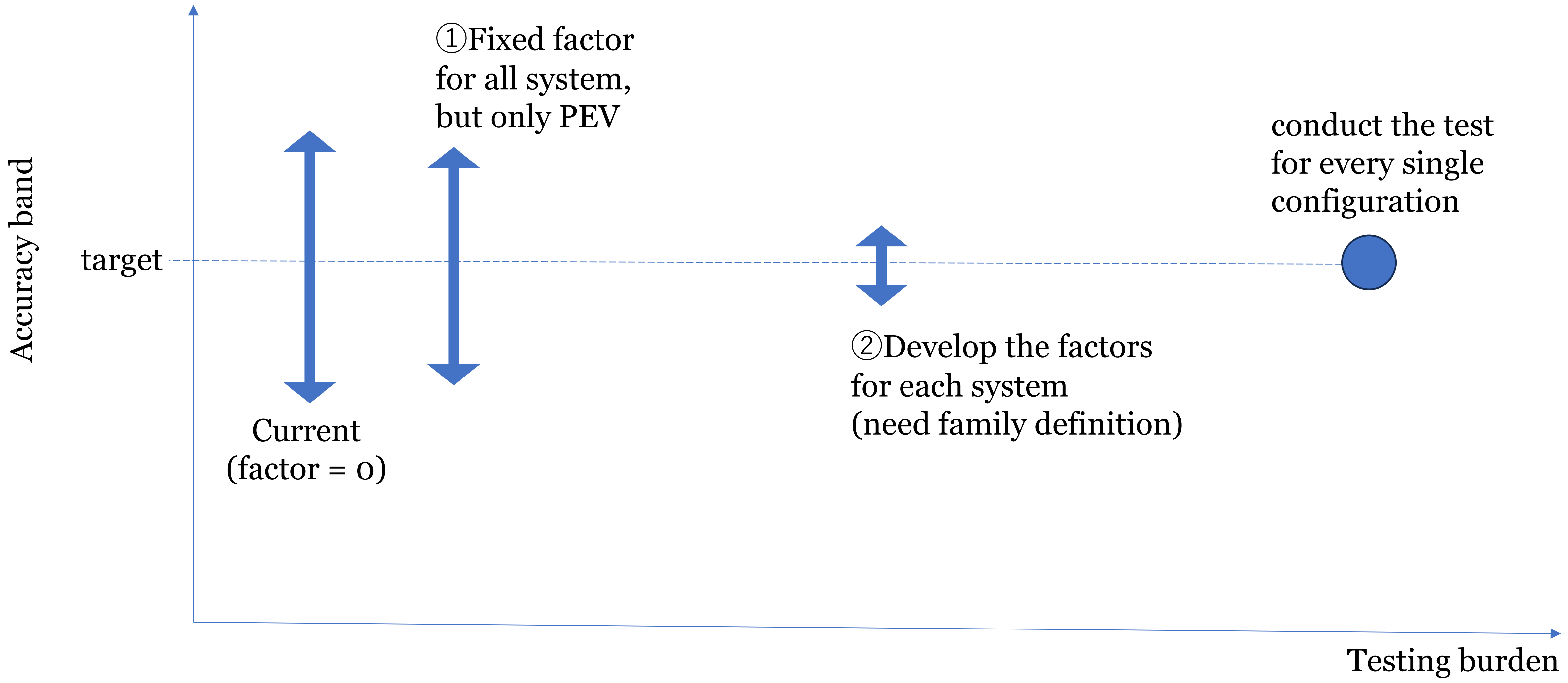
Ad-hoc WLTP Meeting
24th June, 2025



Modified

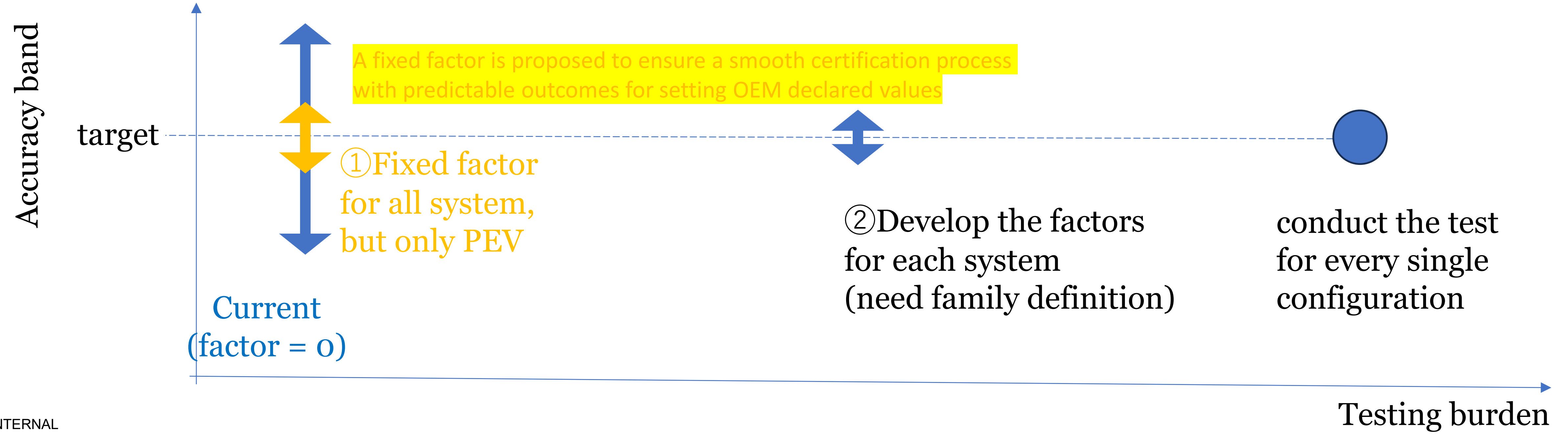

V_H
V_H
physical test
Your Proposal
current
V_H
V_L
factor : 0.95
factor : xx for specific systems
factor : 0
Vehicle_conf_A
CED

1. What is a problem on current procedure ?
2. What is your target accuracy band and what is the reason ?
3. How much the accuracy band will be shrunk for ① and ② ?
4. Why only for PEV ?



Modified

1. What is a problem on current procedure ?
With the introduction of Battery Durability SOCR, the measured Range (recuperation is considered as individual vehicles are tested) will be compared to the certified range (recuperation is not considered in the interpolation of individual vehicles). This can cause a "fail" for the monitor (SOCR) accuracy, which has no physical reason but is only due to unprecise/wrong modelling of range/consumption influenced by optional equipment (e.g. tires, rims, spoilers, sunroof, …), neglecting the physical behaviour during recuperation phases. Additionally, we expect more market surveillance testing for el. Range with e.g. introduction of EU7.
2. What is your target accuracy band and what is the reason ?
Example: 600 km +/- 18km (could be even more). Reason: Inform customers about physical correct range / consumption influence of optional equipment for improved customer decision making/ information (=continue in the original spirit of WLTP). In any case the proposal is always better than the current situation efficiency factor = 0). We would like to achieve a big improvement in accuracy with a very simple approach
3. How much the accuracy band will be shrunk for ① and ② ?
E.g. for ①: +/-18km improved to +/-3km. E.g. for ② : +/-18km improved to +/-1 km.
4. Why only for PEV ?
PEVs with biggest physical influence (highest recuperation energies), OVC-HEV range is lower and the interpolated ranges are smaller, so the impact is also smaller, can be considered at a later stage for simplification reasons



Backup

RECU-FACTOR: SENSITIVITY ANALYSIS

Example data to show the sensitivity for a high recu vehicle and a low recu vehicle

Example Data		**Ind. vehicle (high recu)**		**Ind. vehicle (low recu)**		**Delta between "low recu" and "high recu"**
		Range [km]	Percentage [%]	Range [km]	Percentage [%]	Range [km]
Reference	**0,00**	**589**	**100,0%**	**589**	**100,0%**	**0**
RECU factor	0,50	600	101,9%	579	98,3%	21
	0,60	**602**	**102,2%**	**577**	**98,0%**	**25**
	0,70	**605**	**102,7%**	**575**	**97,6%**	**30**
	0,80	**607**	**103,1%**	**573**	**97,3%**	**34**
	0,90	610	103,6%	571	96,9%	39
	1,00	612	103,9%	569	96,6%	43

- A **10% change in drivetrain efficiency** leads to **+/2 km (0,3%) higher spread in range values** between „high recu“ and „low recu“ variants

RECU-FACTOR: SENSITIVITY ANALYSIS

Schematic visualisation with example data