

GTR22: ERRONEOUS UBE-CALCULATION

EVE 81

Ispra, Italy

25.03.2024

acea

To be confirmed.

ERRONEOUS UBE-CALCULATION

~~UBE_{measured}~~ shall be the usable battery energy calculated as follows:

$$UBE_{measured} = UBE_{measured,nc} - \Delta E_{REESS,CC,ave}$$

$$UBE_{measured,nc} = \sum_{i=1}^n \Delta E_{REESS,i}$$

$$\Delta E_{REESS,CC,ave} = \sum_{i=1}^n \Delta E_{REESS,avg,i,CC}$$

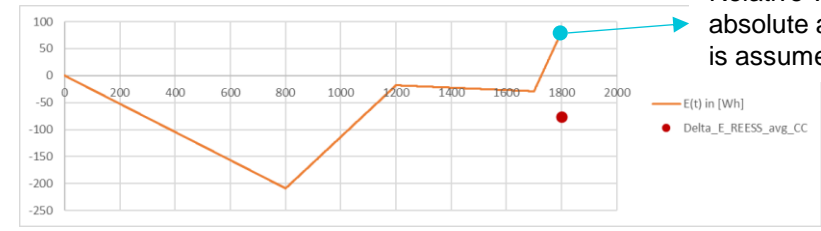
$$\Delta E_{REESS,i} = \frac{1}{3600} \times \int_{t_0}^{t_{end}} U(t)_{REESS,i} \times I(t)_{REESS,i} dt$$

$$\Delta E_{REESS,avg,i,CC} = \frac{1}{3600} \times \frac{1}{t_{end,CC} - t_{start,CC}} \times \int_{t_{start,CC}}^{t_{end,CC}} \int_{t_{start,CC}}^{t_{cl}} U_{REESS,i}(t) \times I_{REESS,i}(t) dt dt$$

Current I(t) acc. To GTR 15/UN R 154 shall be negative if a REESS is discharged.
Acc. to equation it means that UBE is negative as well.

For the example below lets assume -7.000 Wh. Please find it on the right hand side represented by the blue dot.

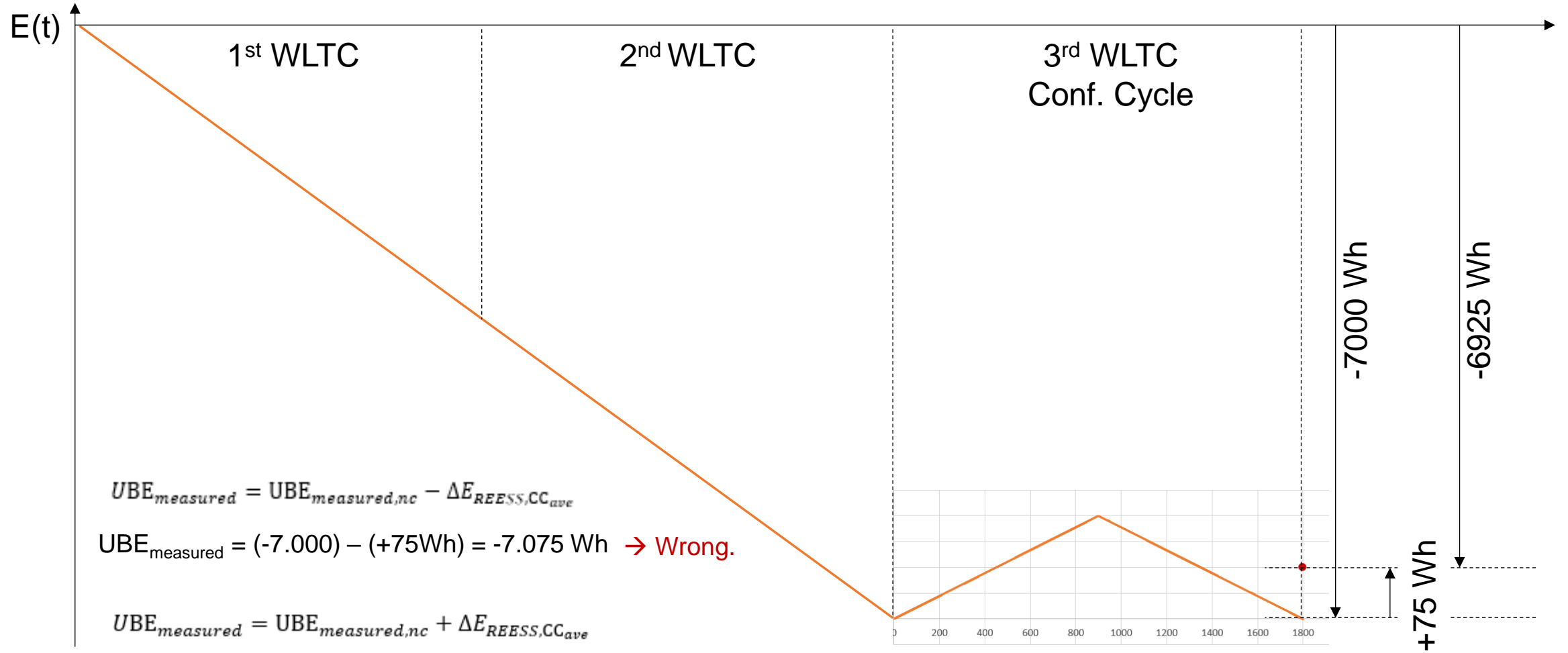
Relative within CC it is +75 Wh but absolute about the whole CD-test it is assumed -7000 Wh.



With the assumption that the current I(t) is again negative when discharged applying the equation results in -75 Wh. See red dot. Blue dot represents the assumed absolute -7000 Wh over the whole CD-test incl. the CC.

To be confirmed.

ERRONEOUS UBE-CALCULATION



$$UBE_{measured} = UBE_{measured,nc} - \Delta E_{REESS,CC_{ave}}$$

$$UBE_{measured} = (-7.000) - (+75Wh) = -7.075 Wh \rightarrow \text{Wrong.}$$

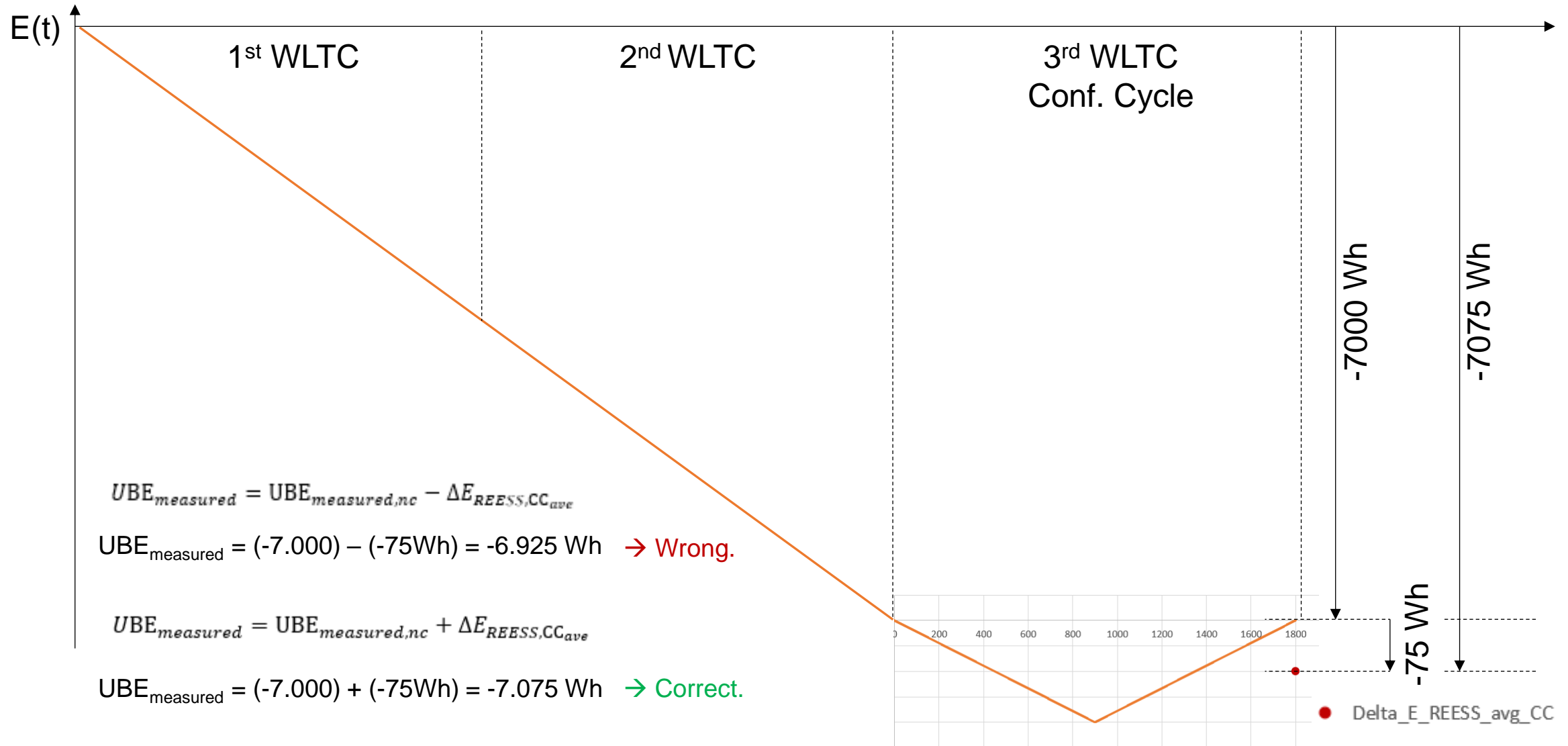
$$UBE_{measured} = UBE_{measured,nc} + \Delta E_{REESS,CC_{ave}}$$

$$UBE_{measured} = (-7.000) + (+75Wh) = -6.925 Wh \rightarrow \text{Correct.}$$

● $\Delta E_{REESS,avg_CC}$

ERRONEOUS UBE-CALCULATION

To be confirmed.



TEXTPROPOSAL GTR22, ANNEX 3

To be confirmed.

- 3. Performance parameters for OVC-HEVs
- 3.1. UBE for OVC-HEVs
- 3.1.1. Measured UBE values for OVC-HEVs

<i>Parameters</i>	<i>Explanation</i>
<u>UBE_{measured}</u>	<p><u>UBE_{measured}</u> shall be the usable battery energy calculated as follows:</p> $UBE_{measured} = UBE_{measured,nc} - \mp \Delta E_{REESS,CC_{ave}}$ <p>Where:</p> <p><u>UBE_{measured,nc}</u> is the non-corrected usable battery energy of the charge-depleting test, Wh;</p> <p><u>ΔE_{REESS,CC_{ave}}</u> is the average electric energy change of the confirmation cycle, Wh;</p> <p>CC means confirmation cycle as defined in <u>GTR15 Annex 8</u>, paragraph 3.2.4.4..</p>



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