

# Shorten Test Procedure (STP)

- Switch from CCP to STP
- Impact of constant speed on time reduction and range
- Length of CSC\_e

# Shorten Test Procedure (STP)

- Switch from CCP to STP

# Shorten Test Procedure

## Switch from CCP to STP

### Consecutive cycles procedure

### Shorten test procedure

Low + Mid + High + exHigh



phases	distance [km]
$3 \times (L+M+H+exH)$	69.8



phases	distance [km]
$2 \times (L+M+H+exH+L+M)$	62.2

#### Proposal:

If the estimated range for the **high vehicle** for the usage of “Consecutive cycle procedure” exceeds **3 test cycles** for Low + Mid + High + Ex-High the “Shorten test procedure” shall be used.

Low + Mid + High



phases	distance [km]
$4 \times (L+M+H)$	60.1



phases	distance [km]
$2 \times (L+M+H+L+M)$	45.7

#### Proposal:

If the estimated range for the **high vehicle** for the usage of “Consecutive cycle procedure” exceeds **4 test cycles** for Low + Mid + High the “Shorten test procedure” shall be used.

#### Remark:

In both cases the remaining electric energy for the constant speed phases is approximately equal to the energy that would be necessary to drive the exHigh part. Hence it is possible to drive 2 times ~ 3 km constant speed phase (of course depends on the constant speed).

# Shorten Test Procedure

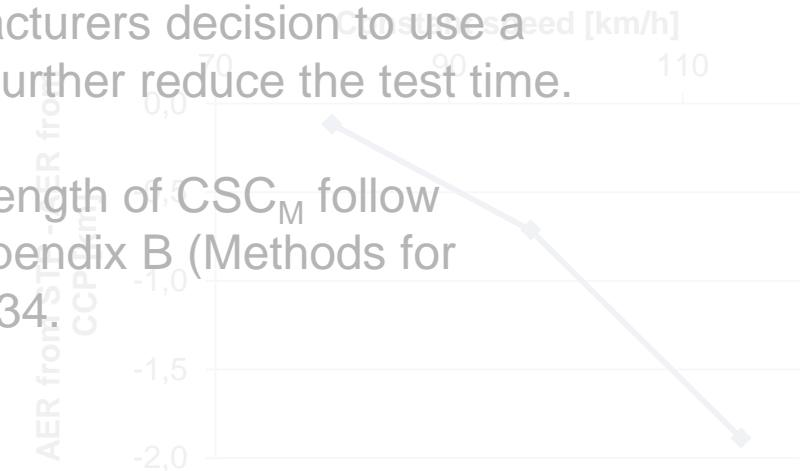
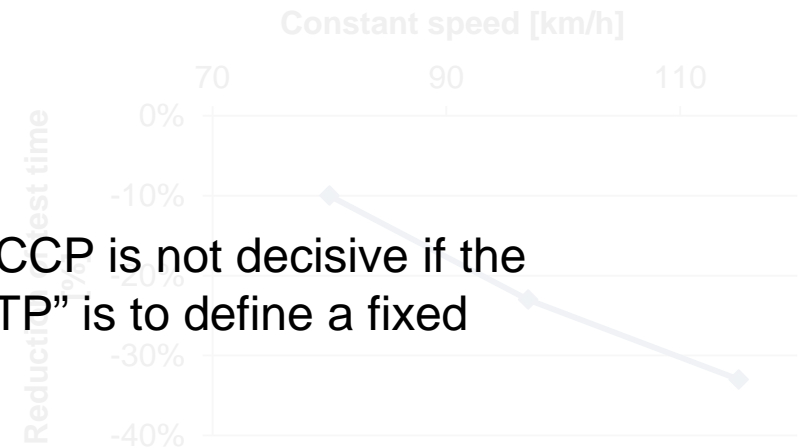
## Switch from CCP to STP

Conclusion:

The AER comparison of the STP to the CCP is not decisive if the agreement to the “Usage of CCP and STP” is to define a fixed boundary as proposed ([link](#)).

Due to the fact that the all electric range is reduced with higher constant speed, it should be the manufacturers decision to use a constant speed of 97 km/h or higher to further reduce the test time.

For the determination of the estimated length of  $CSC_M$  follow paragraph 8.3.3. (Test sequence) or Appendix B (Methods for estimating length of  $CSC_M$ ) of SAE J 1634.



# Shorten Test Procedure

## Switch from CCP to STP

Volkswagen stance:

Volkswagen is supporting the approach introduced in the previous slide

→ Shorten Test Procedure shall be mandatory and not optional

# Shorten Test Procedure (STP)

Impact of constant speed on time reduction and range

# Shorten Test Procedure

## Impact of constant speed on time reduction and range

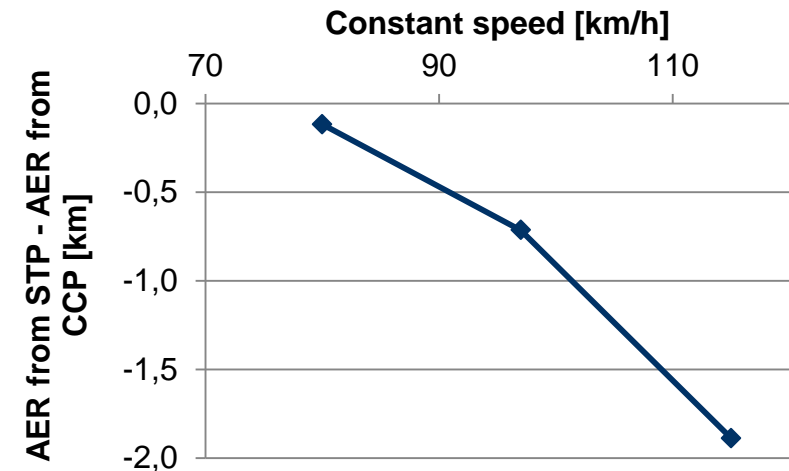
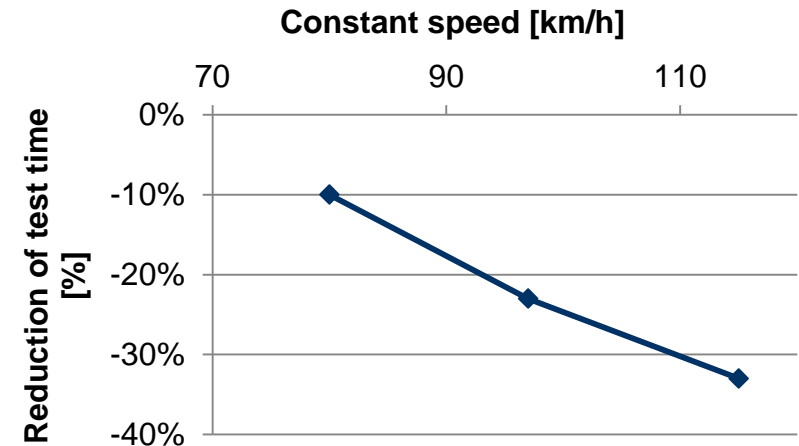
**BMW**  
**results**

The constant speed phase is made to discharge the storage faster than driving consecutive WLTCs.

To discharge the storage faster, a higher average power than driving consecutive WLTCs is needed. Caused by the higher power demand for higher constant speeds, the constant speed is directly linked to the reduction of the test burden (results from vehicle simulation on the top of the right side).

The main impact of the CSC caused by the higher average power are higher losses inside the storage that reduce the *UBE* compared to the CCP.

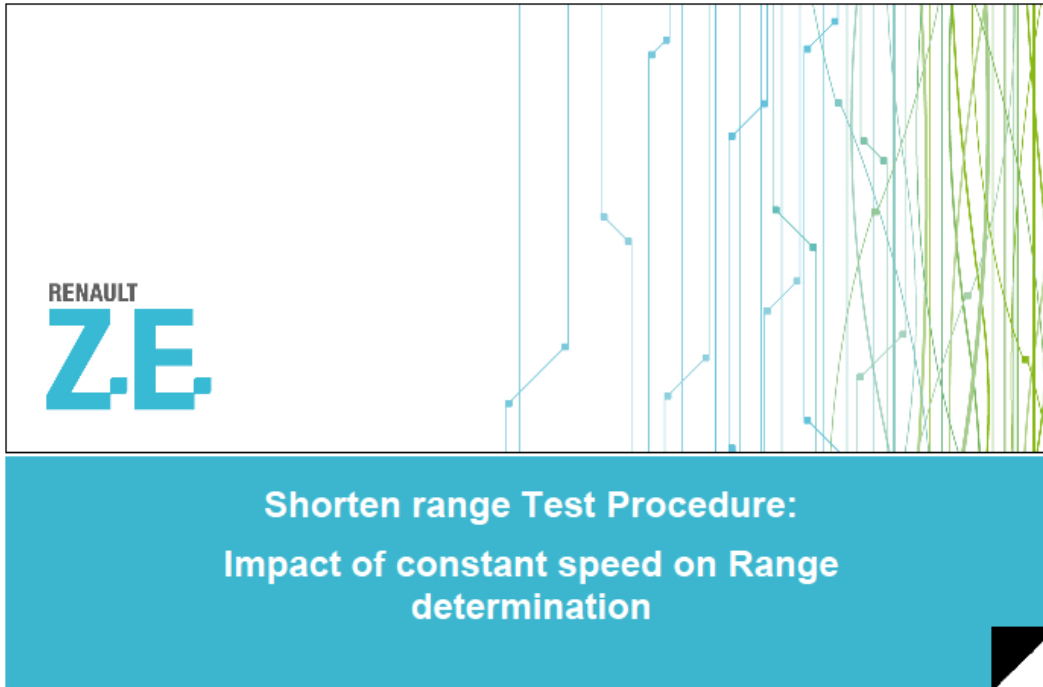
That means as higher the constant speed/power demand as lower is the usable battery energy. This causes the slightly reduced all electric range of the STP compared to the CCP.



# Shorten Test Procedure

Impact of constant speed on time reduction and range

Renault  
results



Nicolas HAREL  
Sam TRIPATHY

DATE

CONFIDENTIEL   
PROPRIÉTÉ RENAULT



 Technische  
Entwicklung  
EAMG/1

Aggregate  
Aggregatemanagement  
Behörden und Vorschriften

Matthias Nägeli  
WLTP und elektrifizierte Antriebe  
18.06.2015





# Shorten Test Procedure

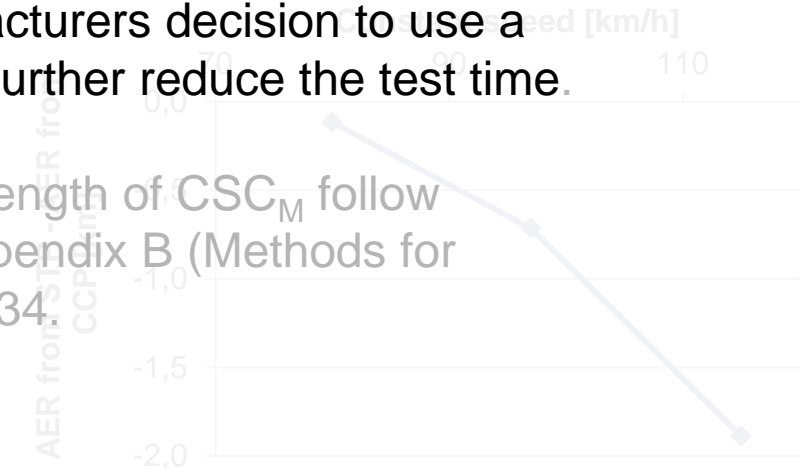
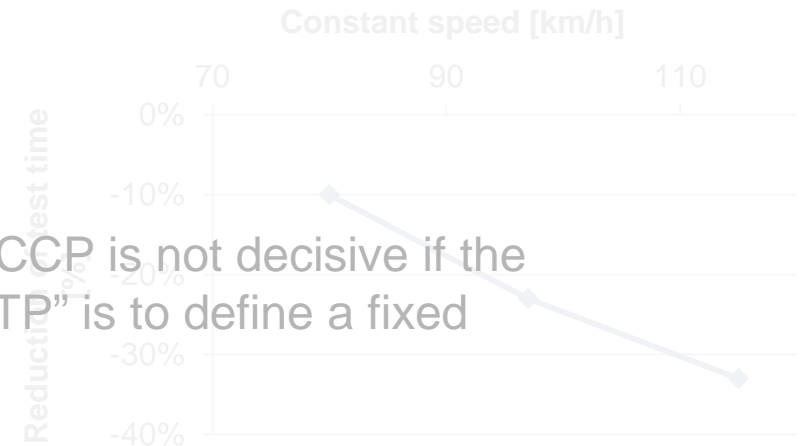
## Impact of constant speed on time reduction and range

### Conclusion:

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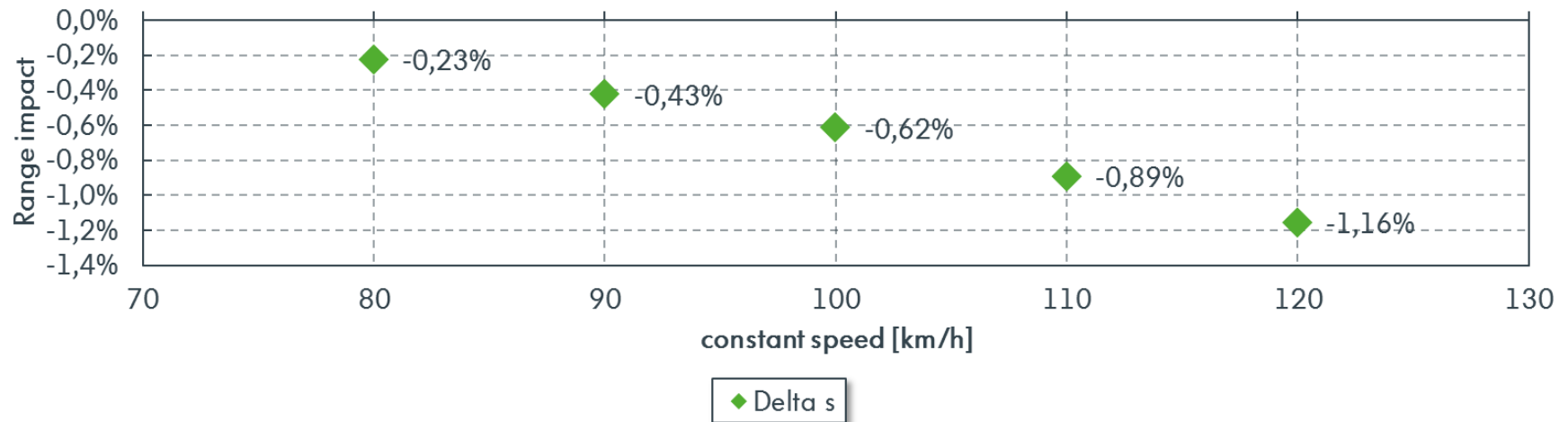
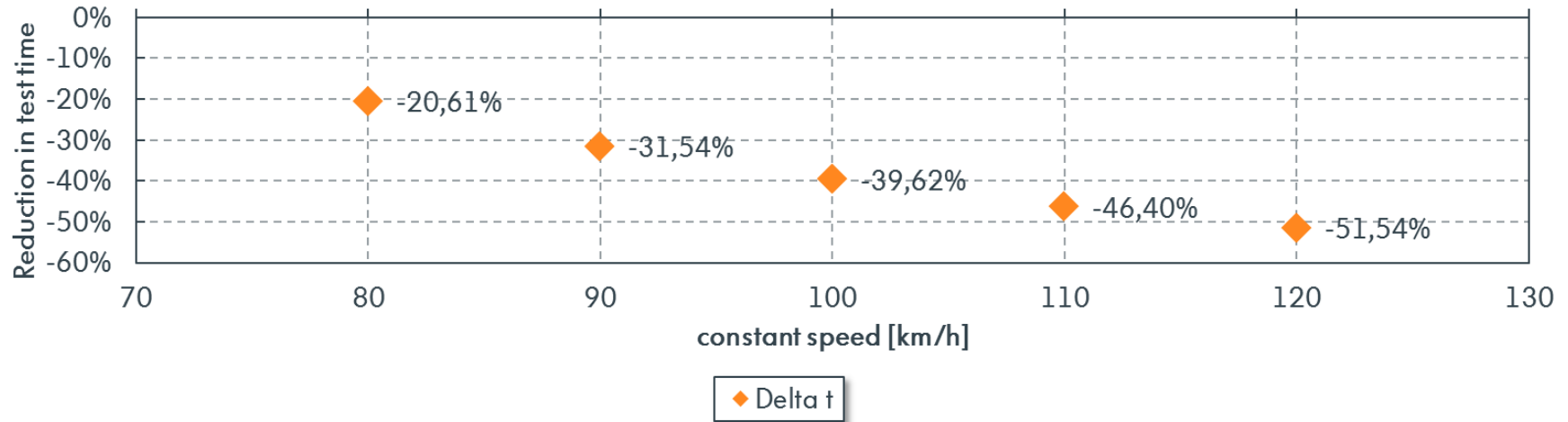
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# Shorten Test Procedure

## Impact of constant speed on time reduction and range



# Shorten Test Procedure

## Definiton of speed within CSC\_m and CSC\_e

### Volkswagen stance:

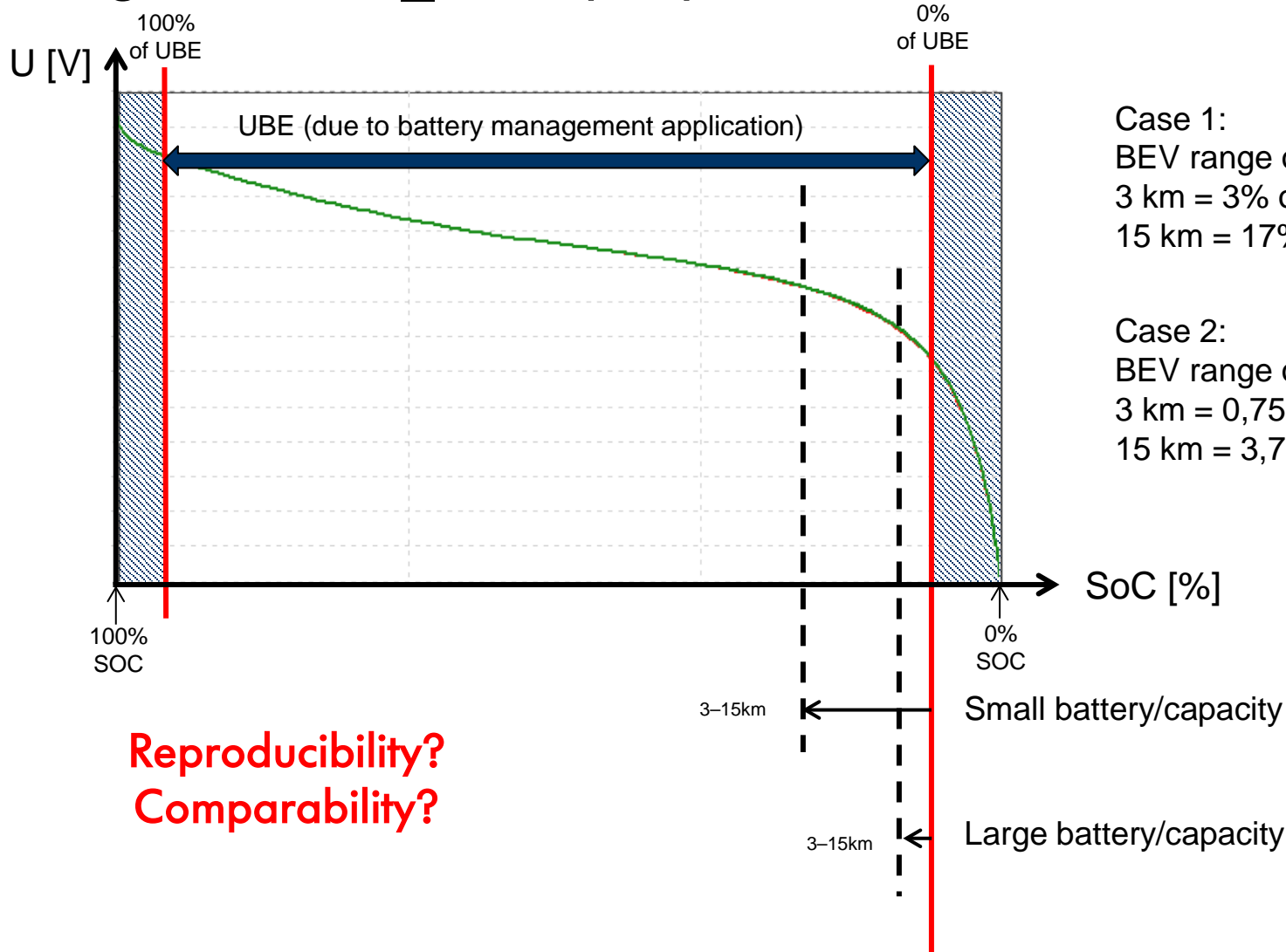
- Volkswagen is supporting a minimum speed for the constant speed phase
  - A fixed speed would be an over regulation
- This minimum speed is
  - for whole WLTC (including exH)  $v = 100$  km/h and
  - for JP/IN-WLTC (excluding exH)  $v = 80$  km/h

# Shorten Test Procedure (STP)

## Length of CSC\_e

# Shorten Test Procedure

## Length of CSC\_e: JP proposal 3 – 15km



Case 1:  
BEV range of 90km (small battery)  
3 km = 3% of total range  
15 km = 17% of total range

Case 2:  
BEV range of 400km (large battery):  
3 km = 0,75% of total range  
15 km = 3,75% of total range

**Reproducibility?**  
**Comparability?**

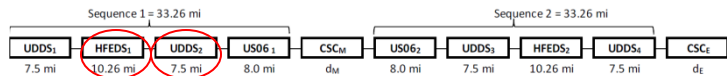
# Shorten Test Procedure

## Length of CSC\_e: ACEA proposal

SoC level at the second speed segment shall be at a comparable and reproducible level

As the SoC level is directly connected to UBE)

SAE J1634 Rev OCT2012 (page 25) provides an appropriate equation to ensure this:



$$d_M = \frac{0.9 \cdot UBE_{est} - 4 \cdot E_{dc_{UDDS}} - 2 \cdot E_{dc_{HFEDS}}}{EC_{CSC}}$$

Transformation into the Shorten Test Procedure for PEV (in the WLTP)

$$d_{CSC\_M} = \frac{0.9 \cdot UBE - 2 \cdot EC_{segment 2} \cdot d_{segment 2}}{EC_{CSC, speed}}$$

$$d_{CSC\_E} = d_{total} - d_{segment 1} - d_{segment 2} - \frac{0.9 \cdot UBE - 2 \cdot EC_{segment 2} \cdot d_{segment 2}}{EC_{CSC, speed}}$$

