INTEGRATED ENERGY & THERMAL MANAGEMENT

VALIDATOR

North America 500BEV
Curb weight 1355 kg

eMotor
- Peak Power 83 kW
- Peak Torque 220 Nm
- Speed (max) 16000 rpm

Battery
- Voltage 354 V
- Energy 24 kWh
- EPA Range 160 km
- Liquid cooling and heating

CRU (Compact Refrigeration Unit)

Indirect heat pump filled with R290 (propane): cool and heat power are driven to the users by means of coolant loop and a large set of valves (EU founded project OPTEMUS)

Features developed inside CEVOLVER:
- MPC (Model Predictive Control) devoted to the powertrain and cabin thermal management (RWTH)
- enhanced eco-driving (IFPEN)
- enhanced eco-charging (IFPEN)
- cloud connectivity (IFPEN/CRF)

Control integration and testing performed by CRF

Main Results

Energy Savings from Thermal Management Functionalities

home - job - home (15 + 15 km)

\[
TT_{\text{energyconsumptiongain}} = \frac{E_{\text{th,bsl}} - E_{\text{th,eco}}}{E_{\text{th,bsl}}} \times 100
\]

Hot case (35°C)  \( TT_{\text{energyconsumptiongain}} = 2.5\% \)
Cold case (-10°C)  \( TT_{\text{energyconsumptiongain}} = 1.3\% \)

The numbers come from the average of all the test performed with different initial battery SOC (10% / 90%).

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