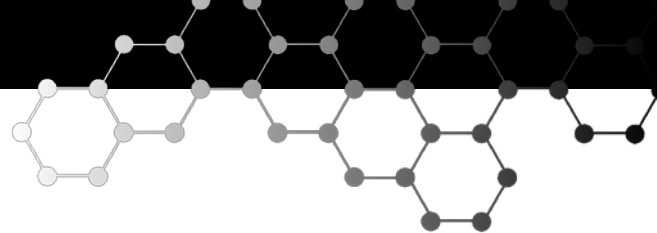


Electric Drive Systems and their **Energy Consumption** in Electric Vehicles

Emma Arfa Grunditz

PostDoc

Electric Power Engineering
Chalmers University of Technology



Consumption and emissions

⚙️ Combustion engine car:

⚙️ liter/km

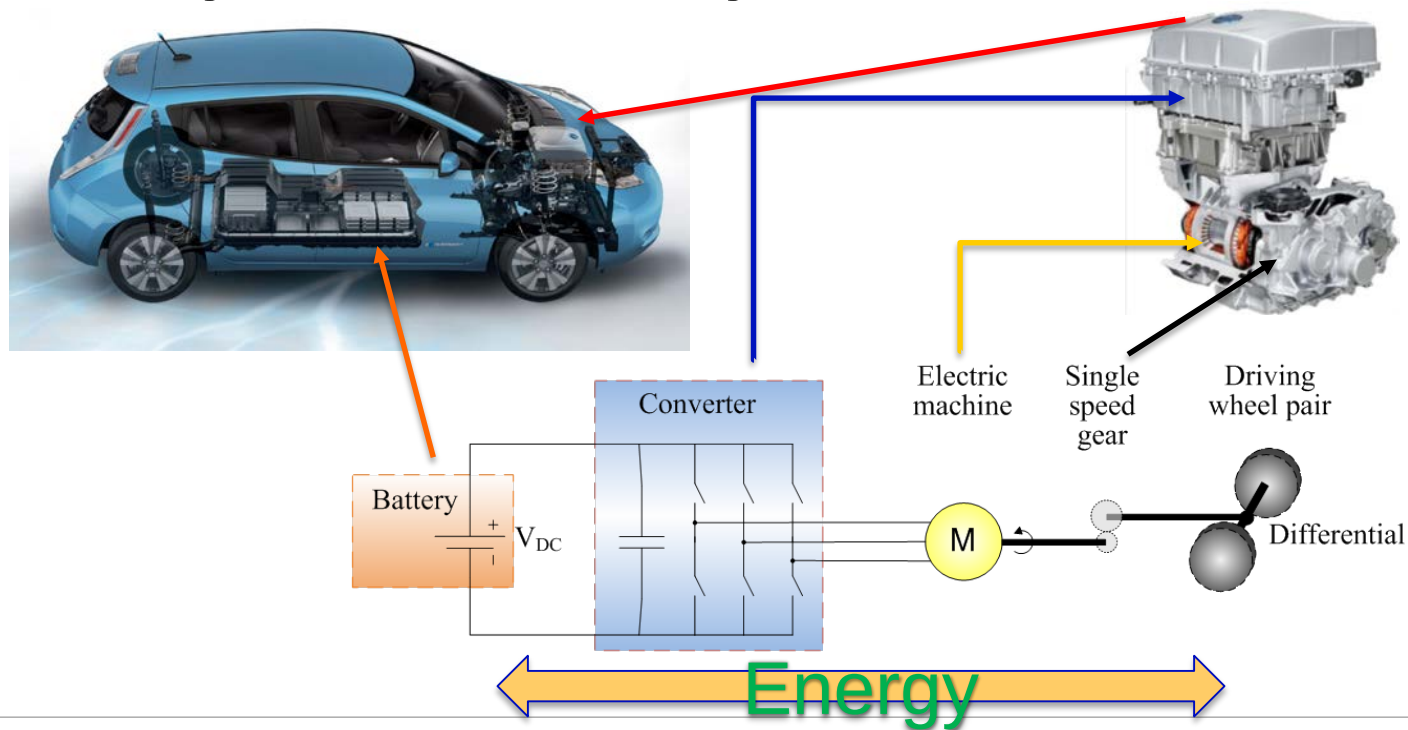
⚙️ **g CO₂/km**

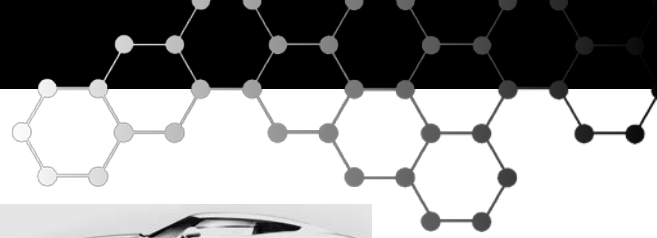
⚙️ Electric car

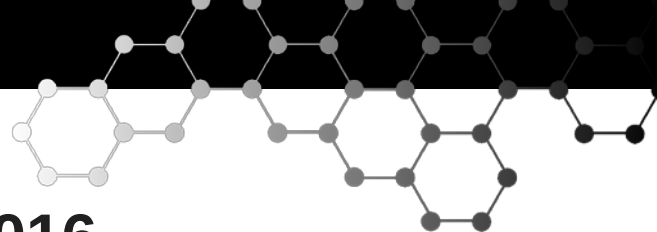
⚙️ Wh/km

⚙️ (g CO₂/km)

Battery Electric Drive System

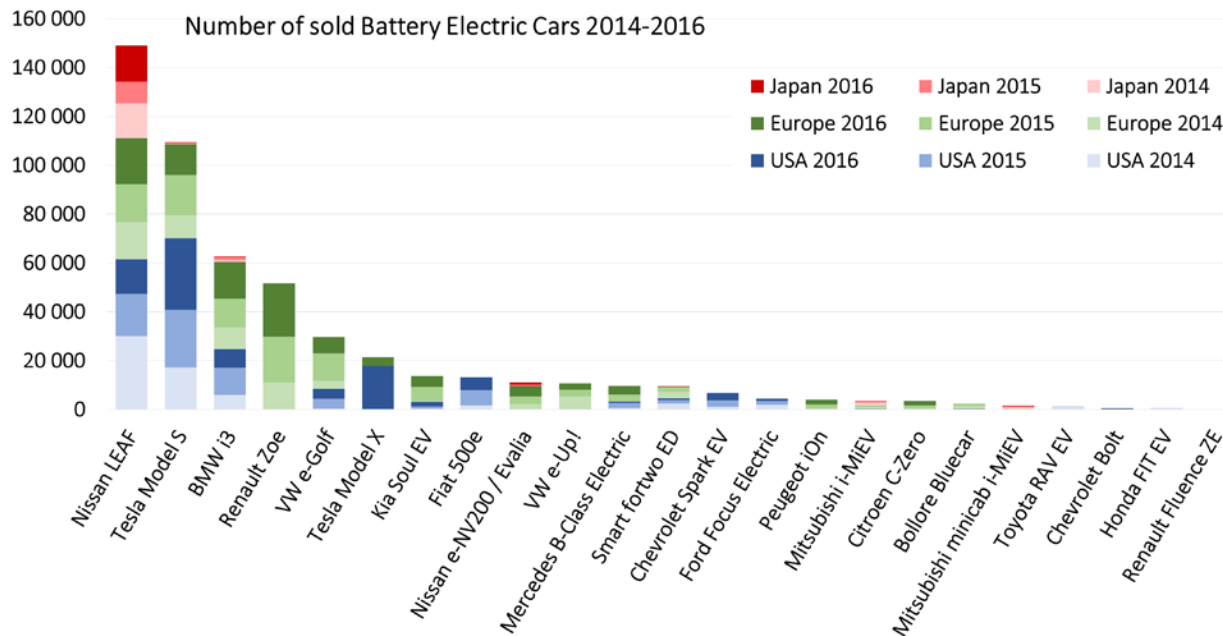




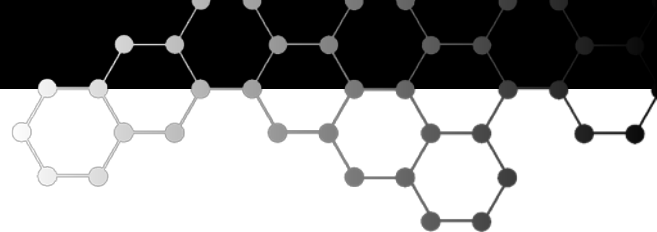


Most sold battery electric cars 2014-2016

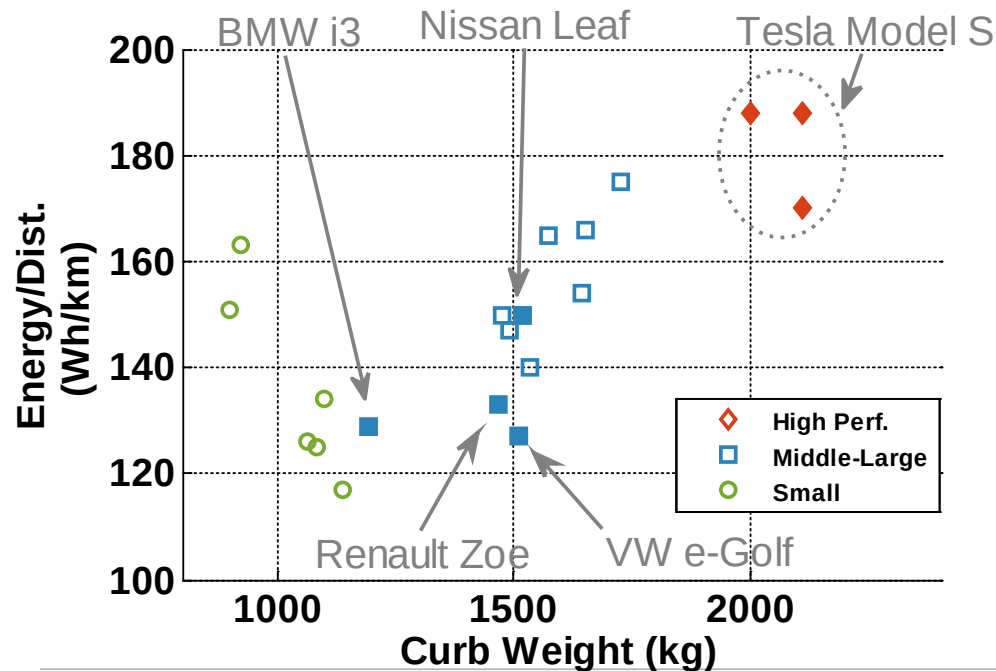
in USA, Europe and Japan



- 1) Nissan Leaf
- 2) Tesla Model S
- 3) BMW i3
- 4) Renault Zoe
- 5) VW e-Golf
- 6) Tesla Model X

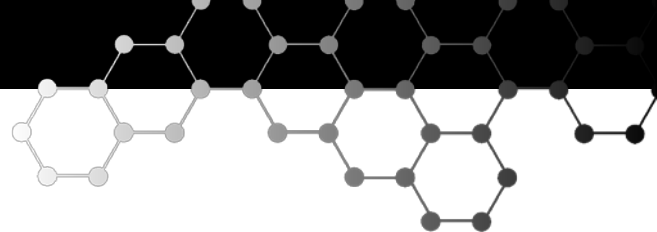


Energy Consumption (NEDC)

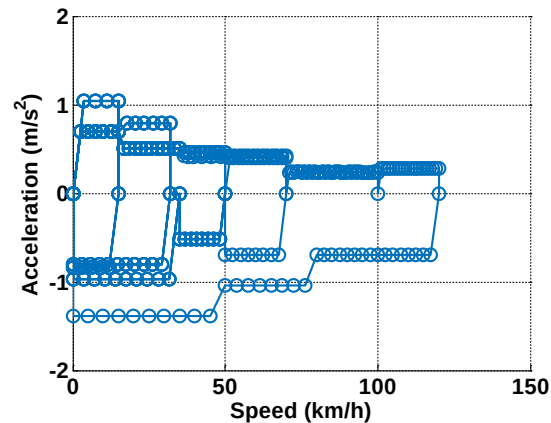
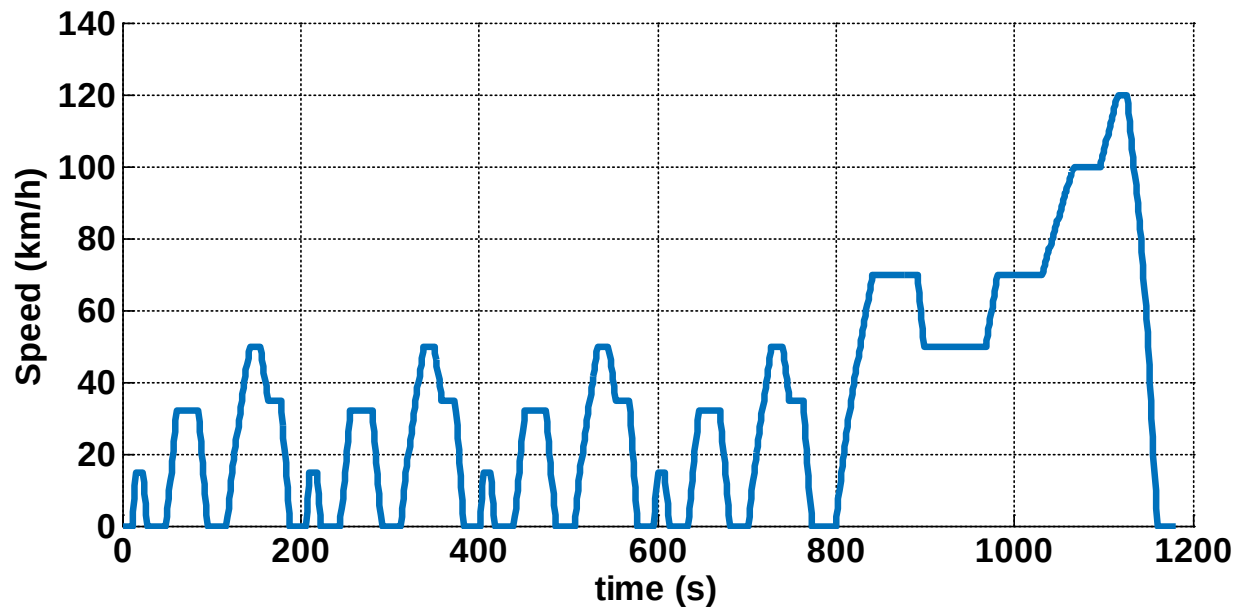


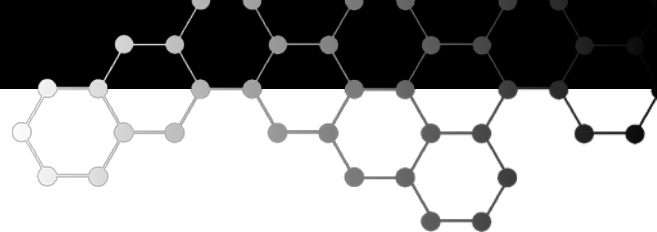
Top sellers - consumption

- 1) VW e-Golf – 127 Wh/km
- 2) BMW i3 – 129 Wh/km
- 3) Renault Zoe – 133 Wh/km
- 4) Nissan Leaf – 150 Wh/km
- 5) Tesla Model S – 170-188 Wh/km
- 6) Tesla Model X – ?

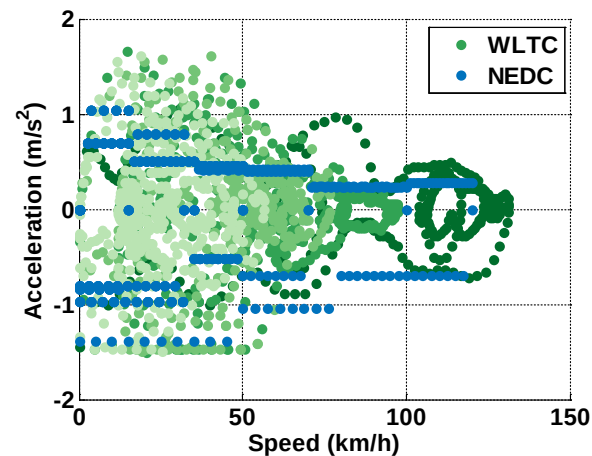
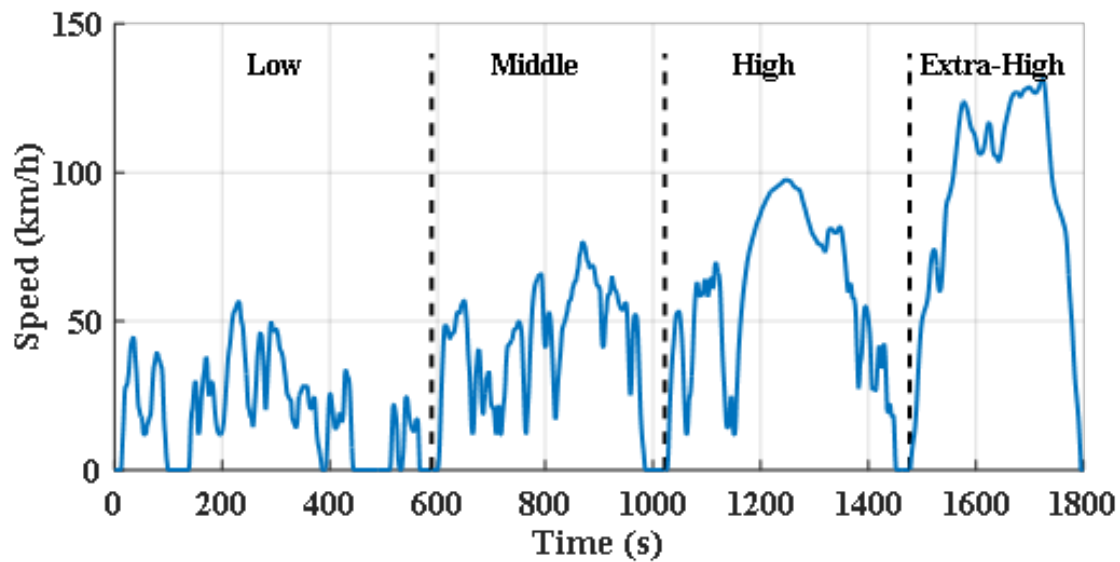


NEDC

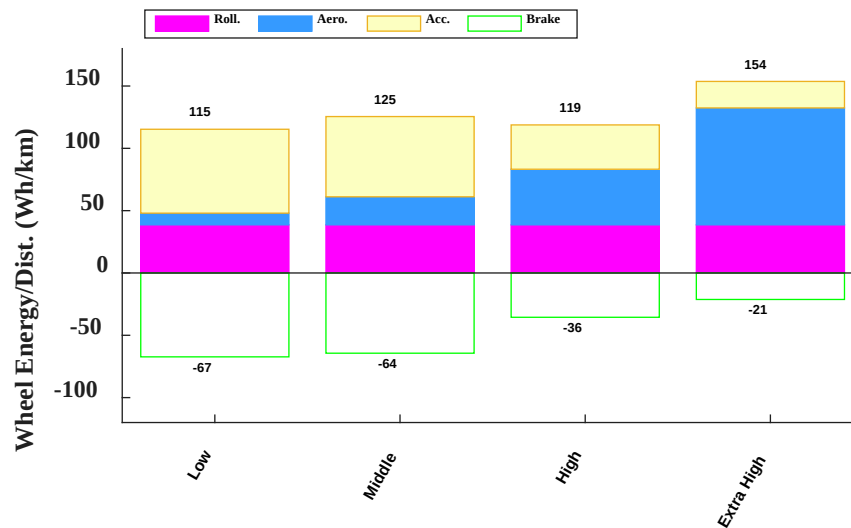
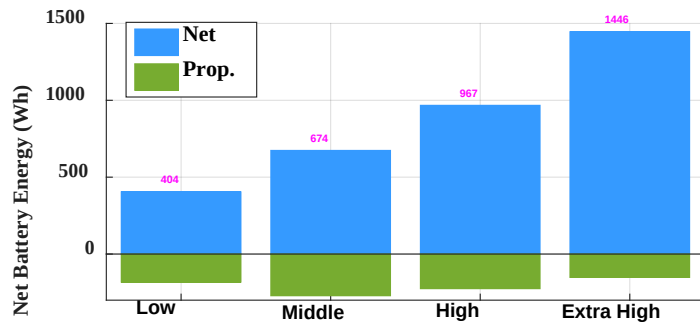
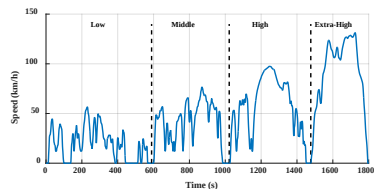




WLTC

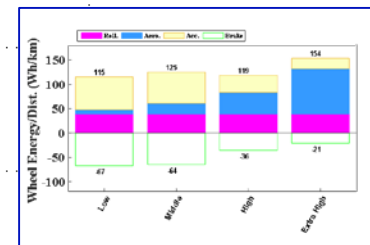
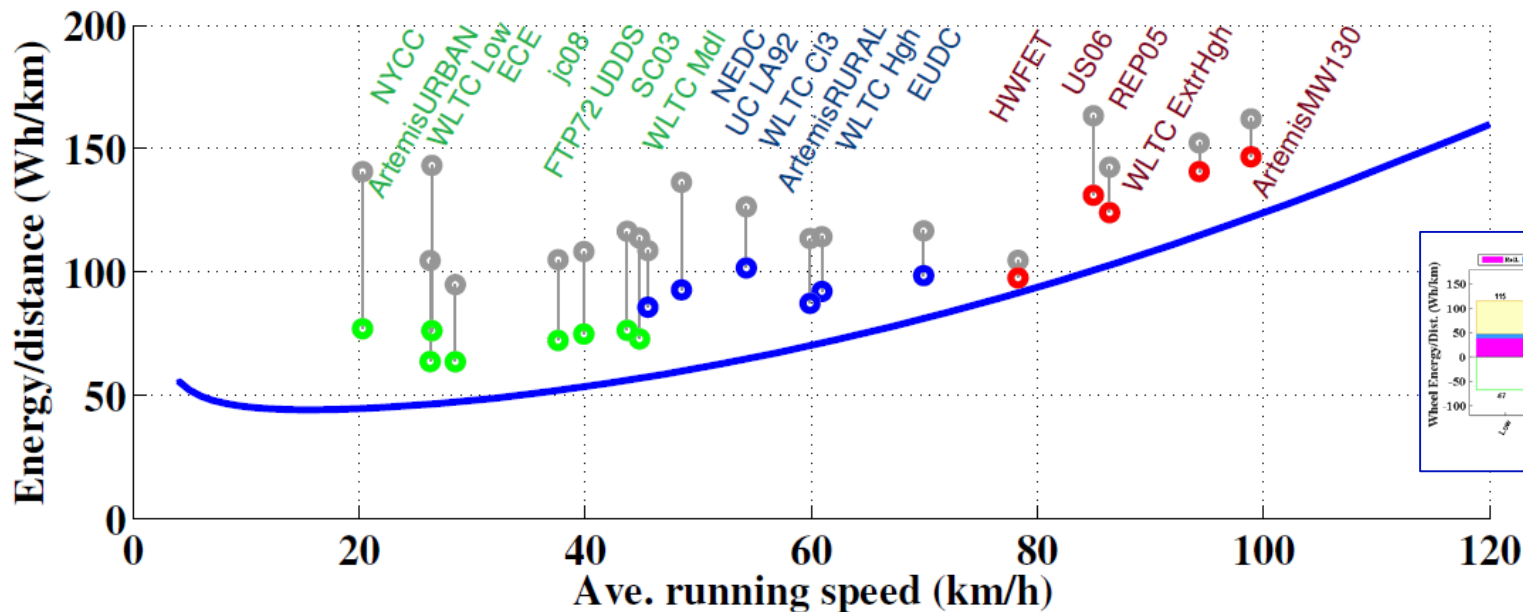


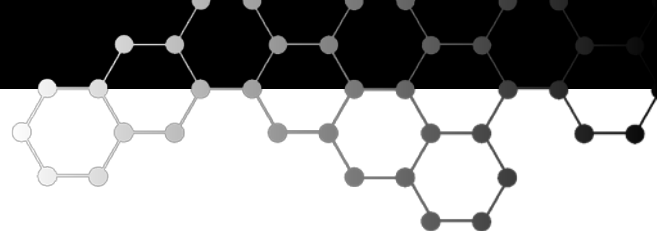
WLTC



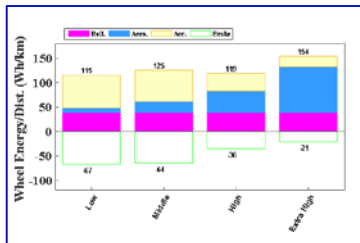
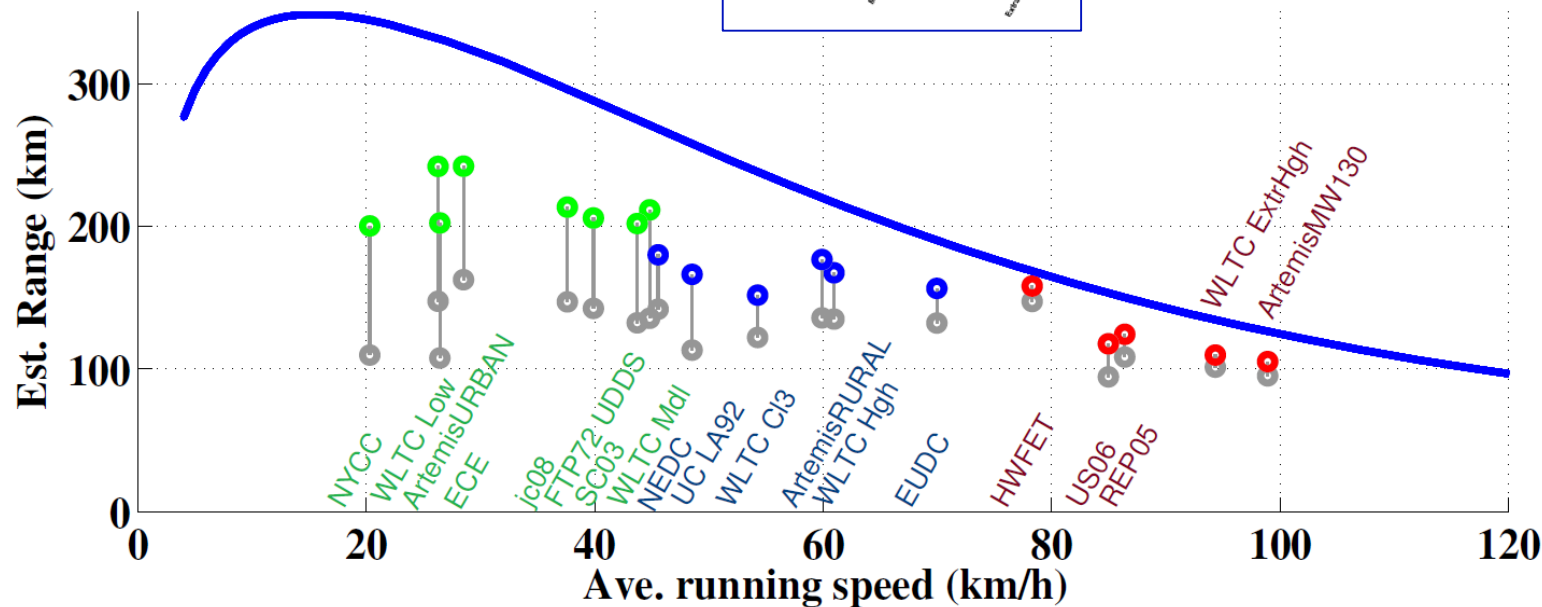


Energy Consumption per distance (Wh/km)

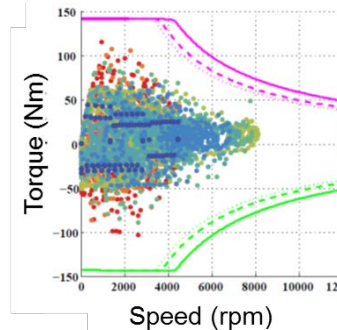
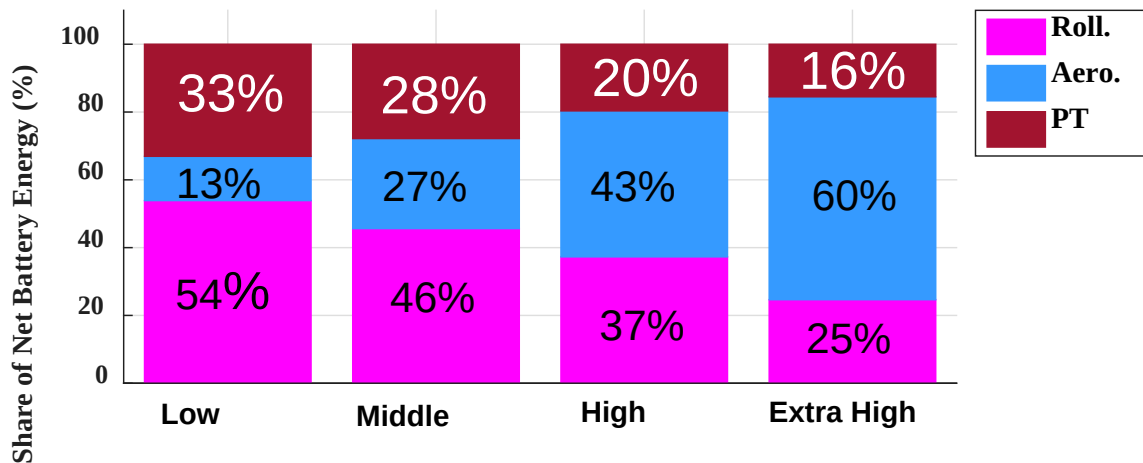
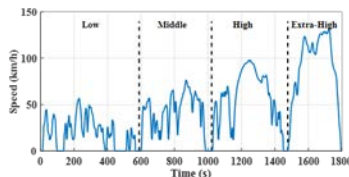




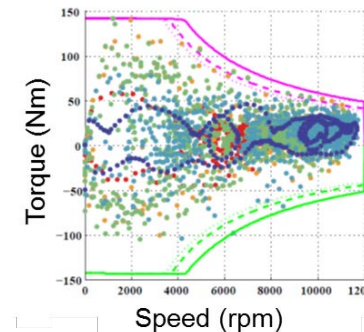
Driving range (km)



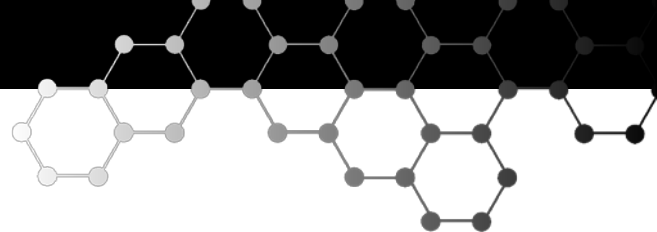
Wh/km Electric Drive system loss share (WLTC)



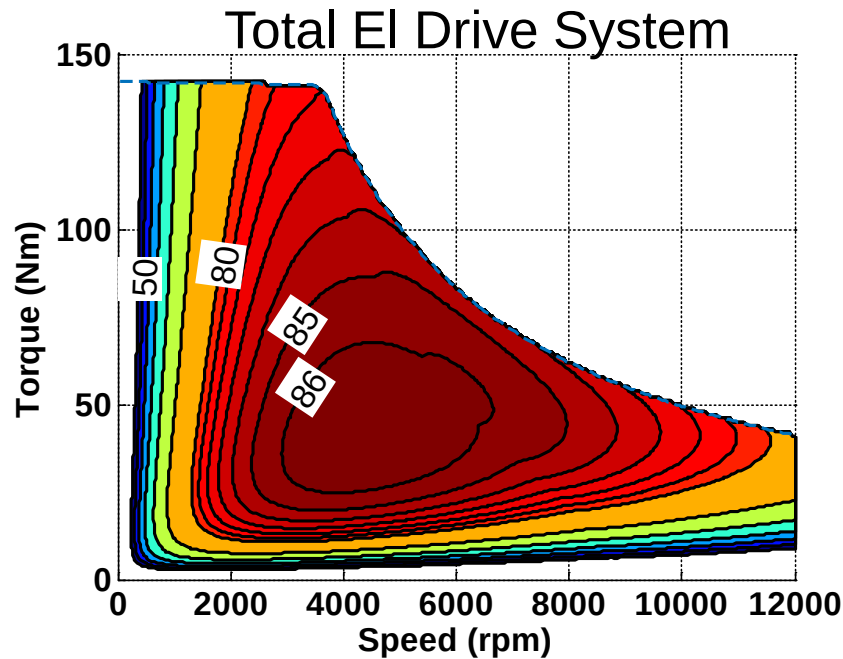
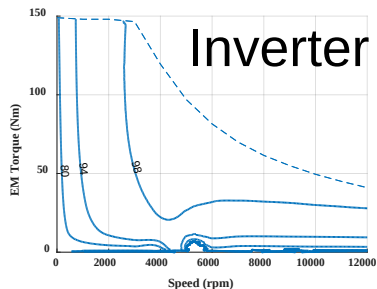
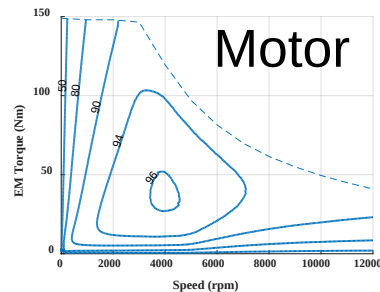
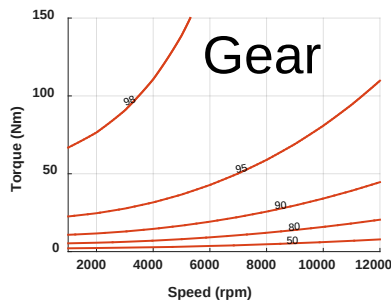
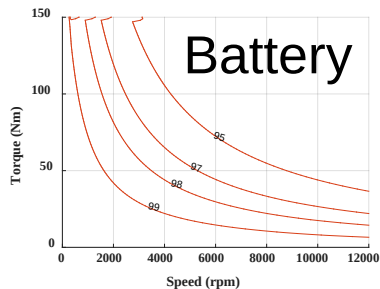
Low speed

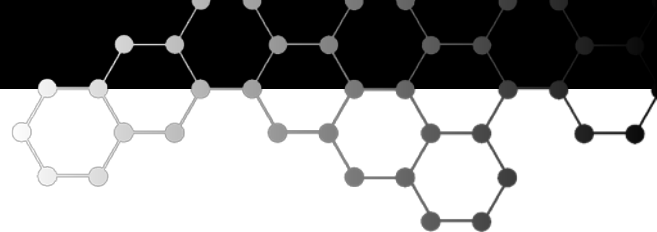


High speed cycles

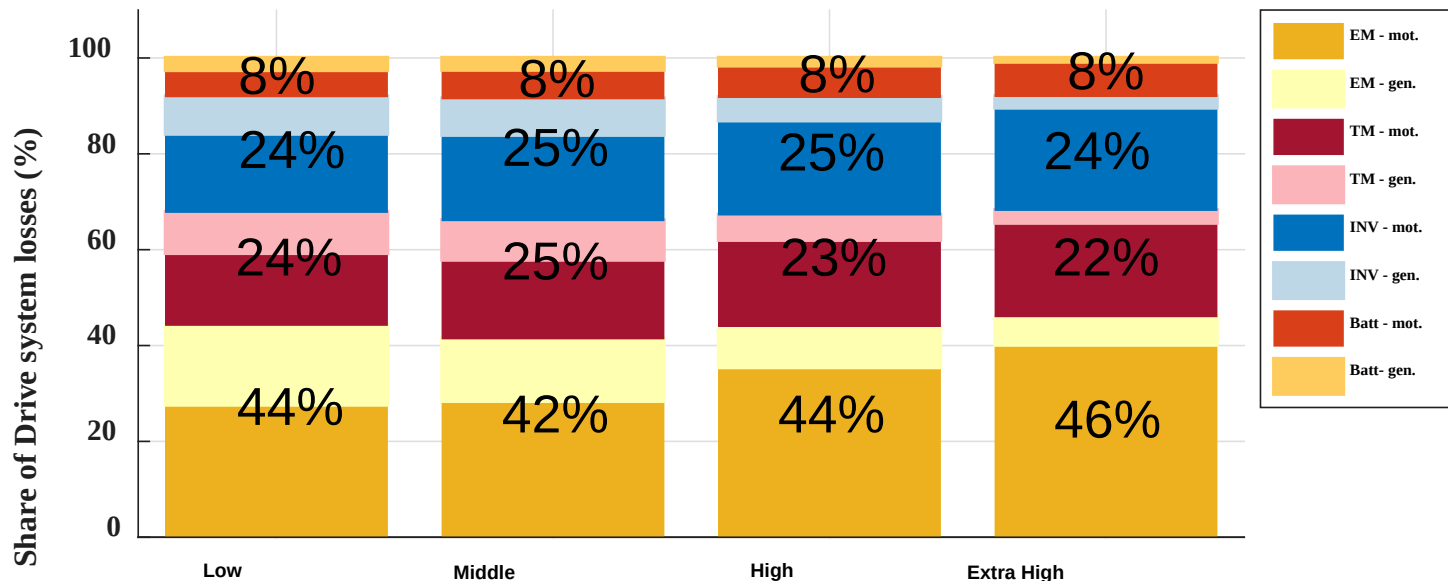


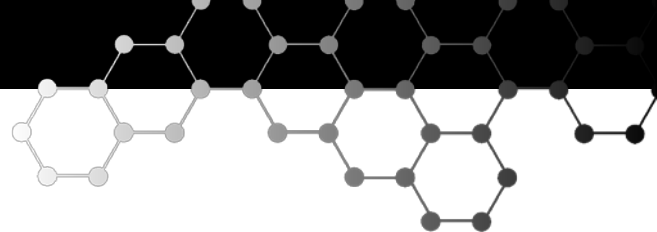
Drive system efficiency





Share of Drive System Losses (WLTC)





Thank You! 😊

