

Decarbonisation of Winter Tourism by Hydrogen Powered Fuel Cell Snowmobiles

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A3PS Conference Eco-Mobility 2020
Nigel Foxhall



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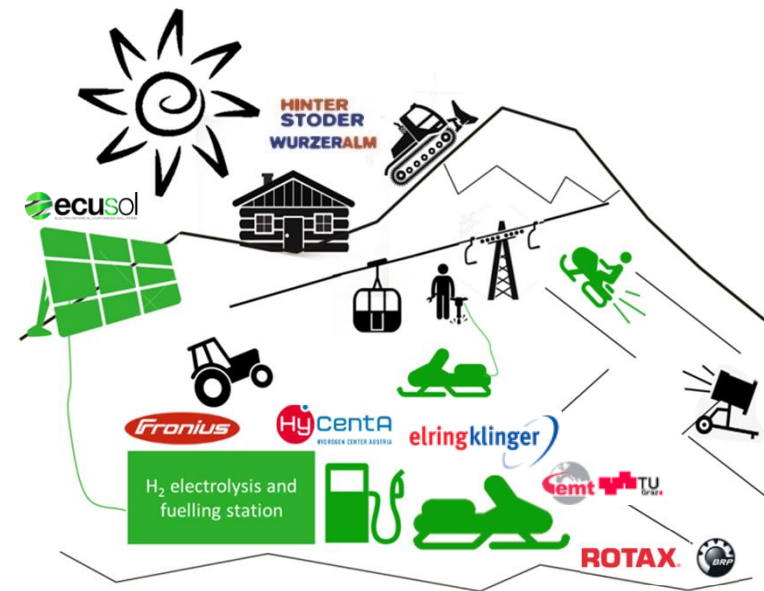
High Level Goals of HySnow



Sustainable vehicles & infrastructure

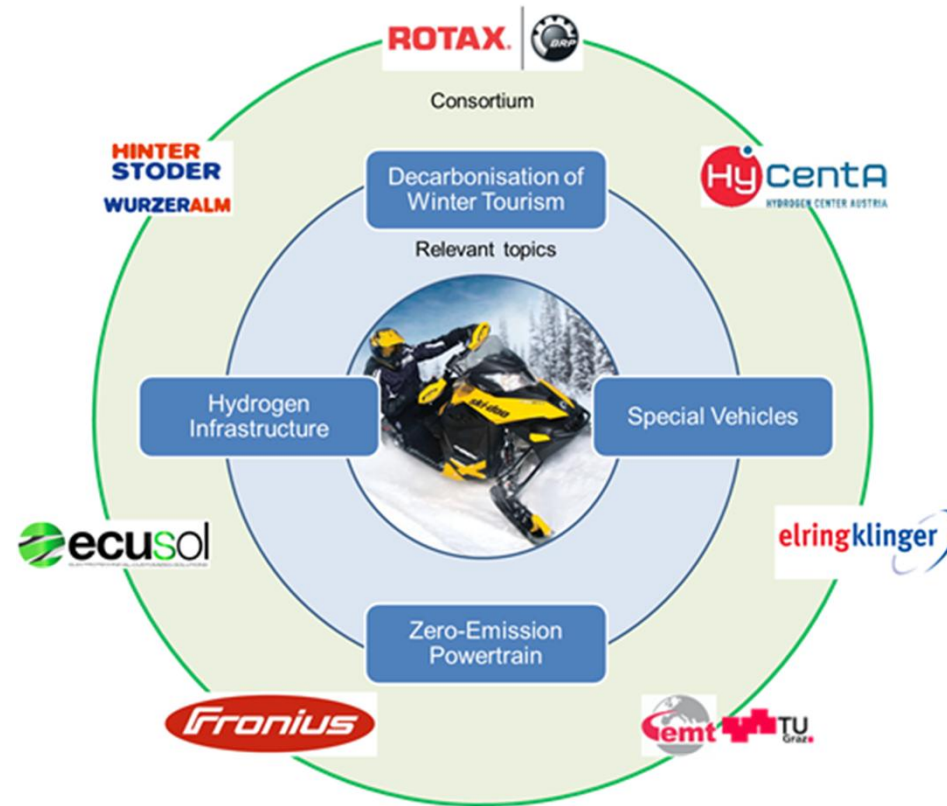
- **Research on key issues** regarding freeze start and degradation of FC
- **Development of hydrogen-powered fuel cell snowmobile**
- **Development of sustainable on-site hydrogen refueling station**
- **Demonstration of two vehicles over two winter seasons**
- **Basis for subsequent series development and paradigm change of propulsion technology**

Hydrogen Ecosystem for Winter Tourism



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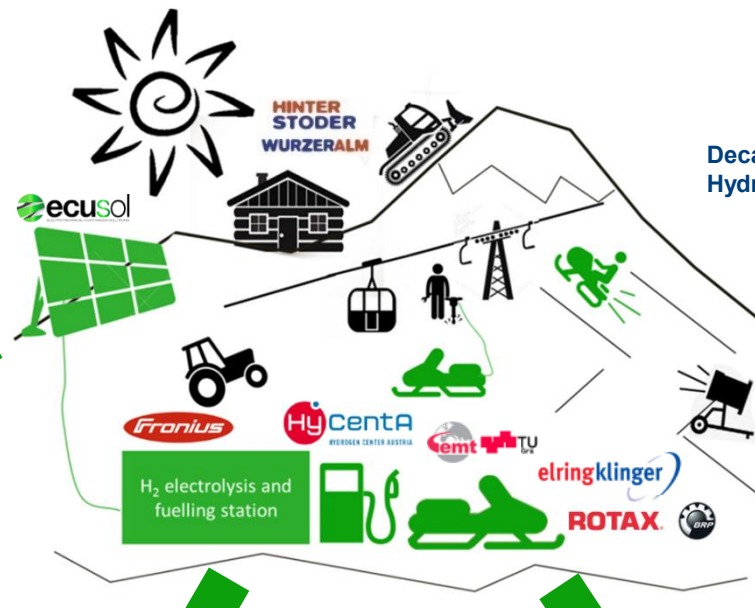
Consortial Partners in HySnow



HySnow Achievements



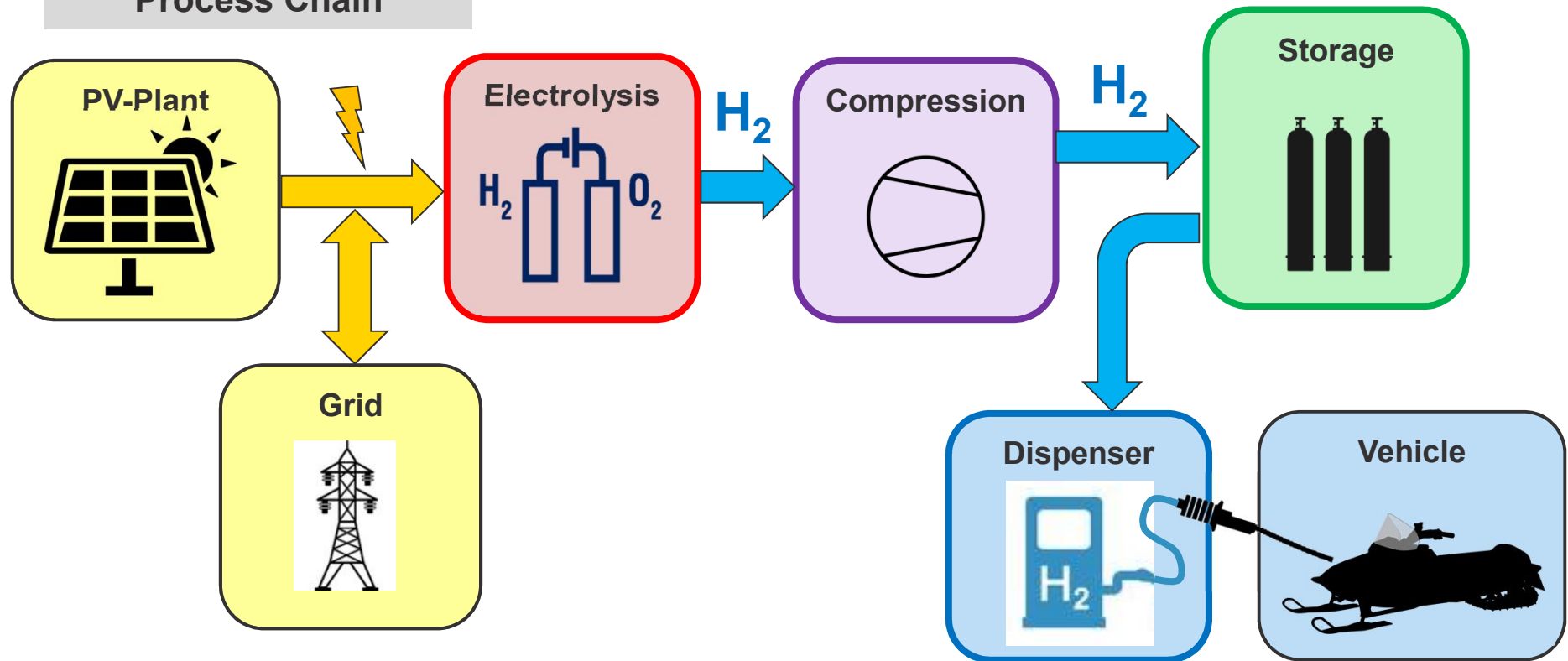
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H2 Infrastructure

Process Chain



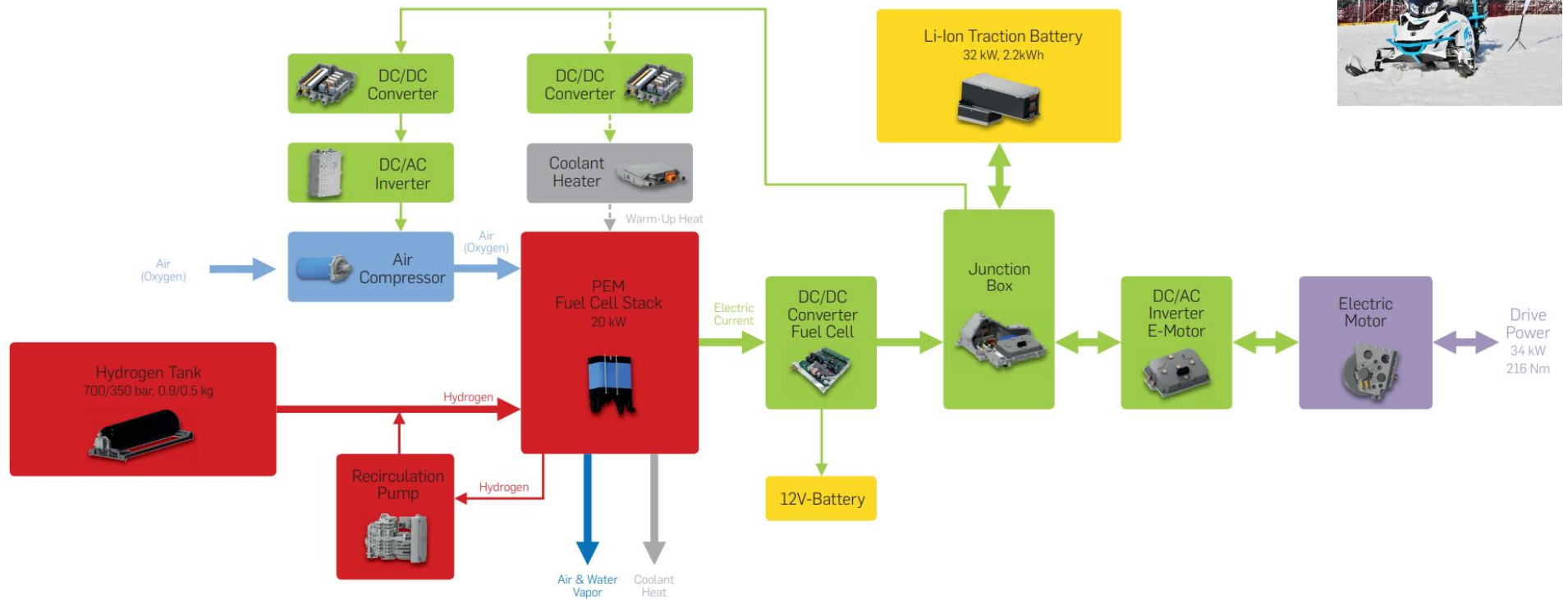
Hydrogen Infrastructure

Infrastructure in test operation



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Fuel Cell Powertrain - Layout

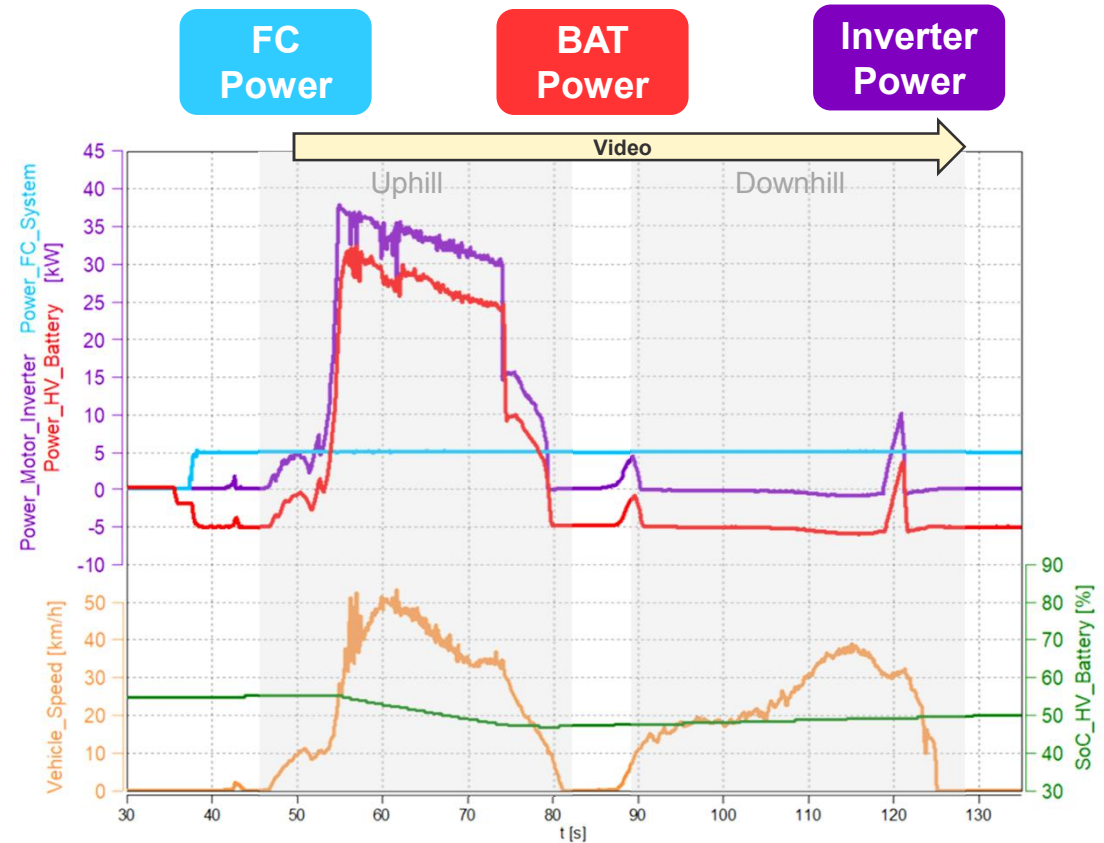
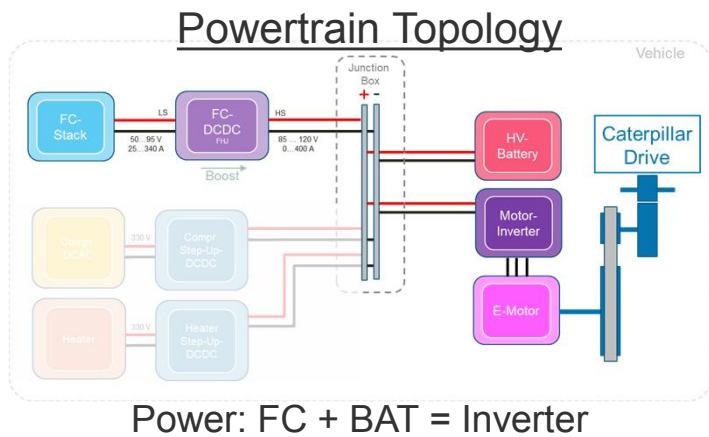




Field Testing at Skiing Area Hinterstoder-Wurzeralm

Overview: Uphill & Downhill Drive

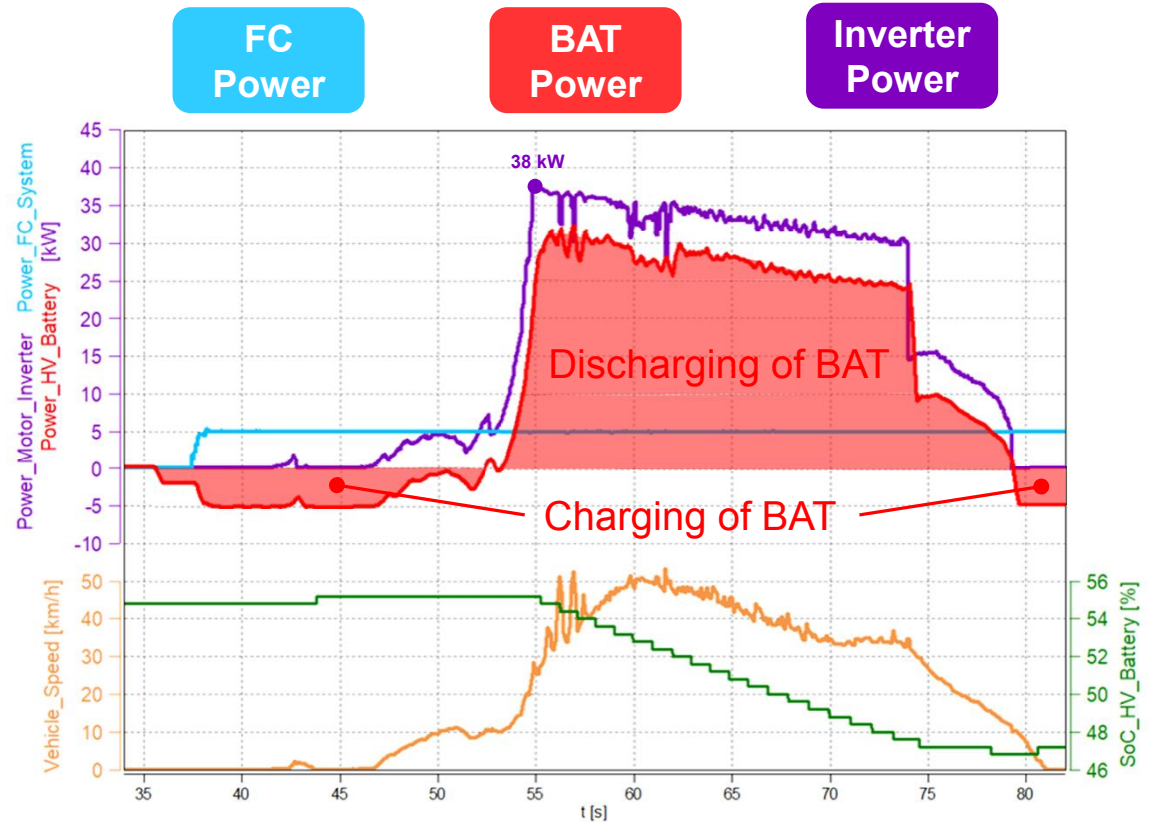
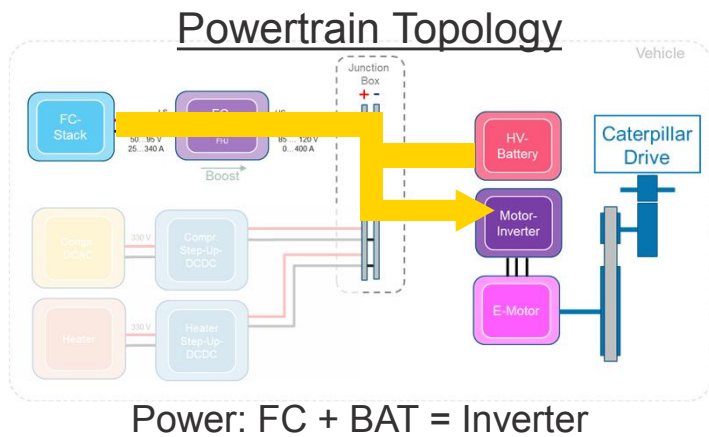
Drive Duration: 1.5 min
 Max. Vehicle Speed: ~54 km/h
 Max. Inverter Power: ~38 kW
 FC-System Power: 5 kW



Field Testing at Skiing Area Hinterstoder-Wurzeralm

Uphill Drive

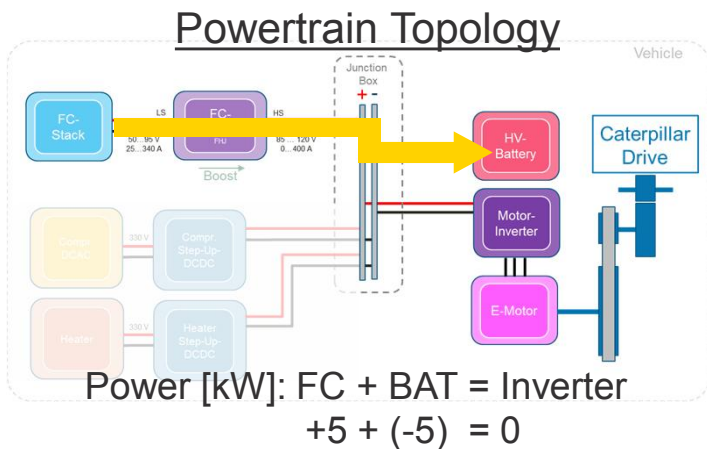
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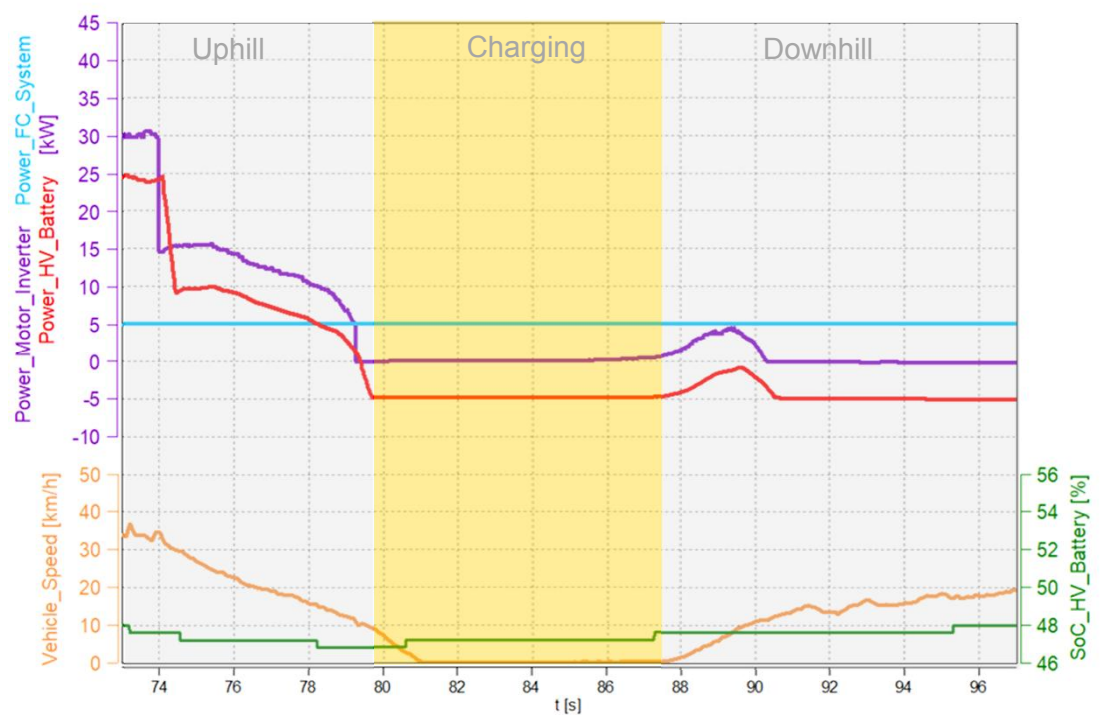
Field Testing at Skiing Area Hinterstoder-Wurzeralm

Vehicle Stop: Charging of HV-Battery with FC

Vehicle Speed: 0 km/h
 FC-System Power: +5 kW
 HV-BAT Power: -5 kW
 Inverter Power: 0 kW



FC Power **BAT Power** **Inverter Power**

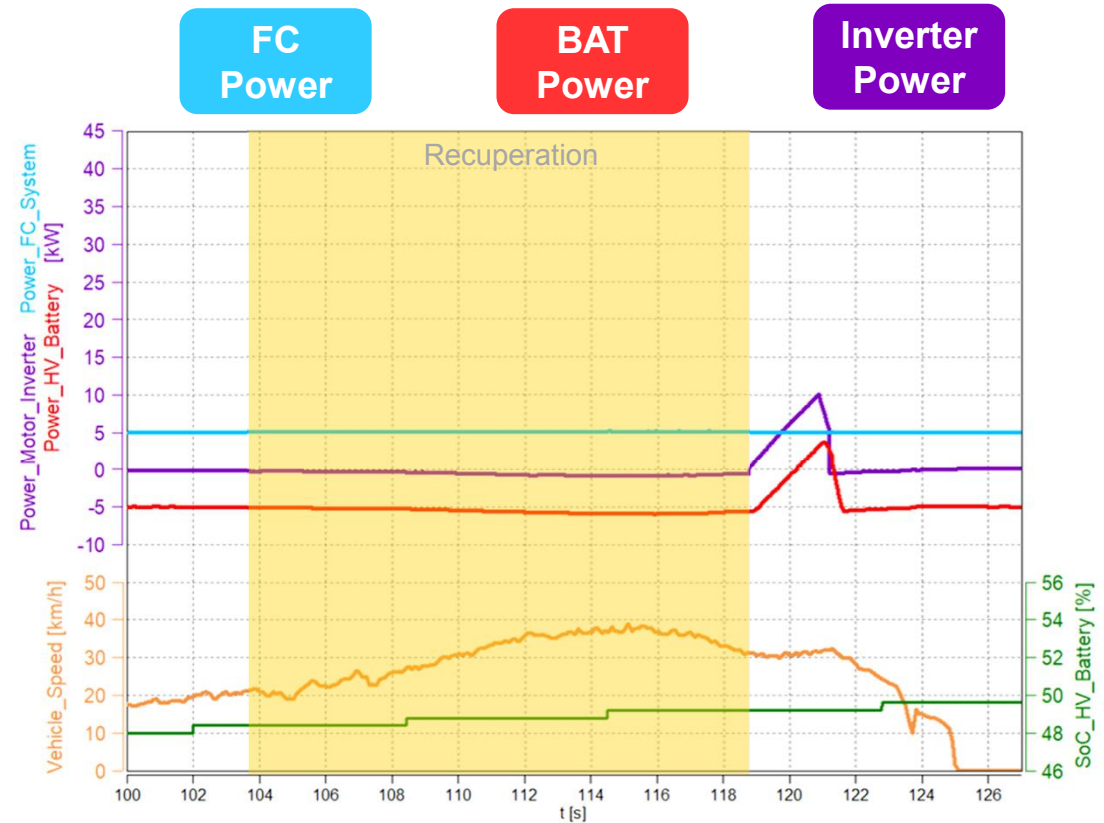
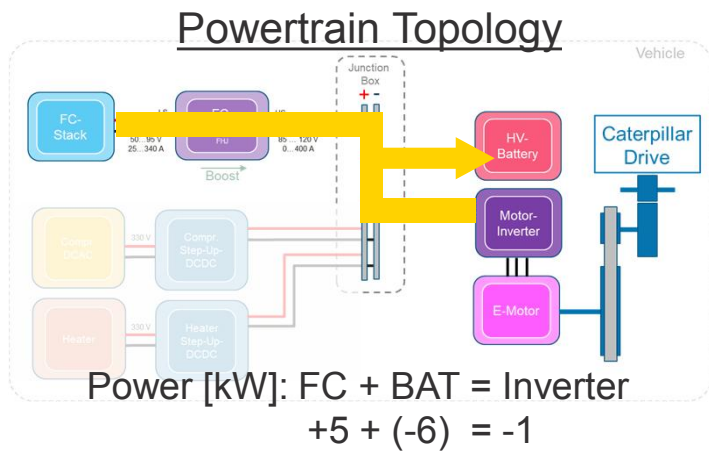


Field Testing at Skiing Area Hinterstoder-Wurzeralm

Downhill Drive: Recuperation

Duration: 15 s

Recuperation Power: ~1 kW (max. 8 kW)



HySnow Presentation – Ski World Cup Hinterstoder 2020



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Thank you for your attention!

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