
We make it possible
Hutchinson’s engineered materials
For Dynamic Thermal Management
HUTCHINSON®

What we do

We design solutions within 6 main expertises ranging from materials to connected systems

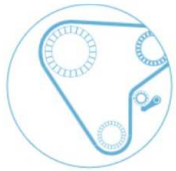
6 expertises


Fluid Management Systems


Body Sealing Systems


Precision Sealing Systems


Antivibration Systems


Belt Drive Systems


Materials & Structures

deployed on 6 markets


Automotive


Aerospace


Defense


Industry


Railroad


Oil & Gas

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Who we are in a nutshell

A company of TOTAL

With €4.154 billion revenue in 2018

€211 million in R&I

5% of our revenue

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Ronak Patel, a CPA auditor in New Jersey, bought a Model 3 last August. He's driven about 150 miles in the cold over the last few days. **"My biggest concern is the cold weather drained my battery 20 to 25 miles overnight and an extra five to ten miles on my drive to work,"** he said. **"I paid $60,000 to not drain my battery so quickly."**

http://fortune.com/2019/02/02/electric-cars-batteries-winter/

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Electric Vehicle range testing feb 2019

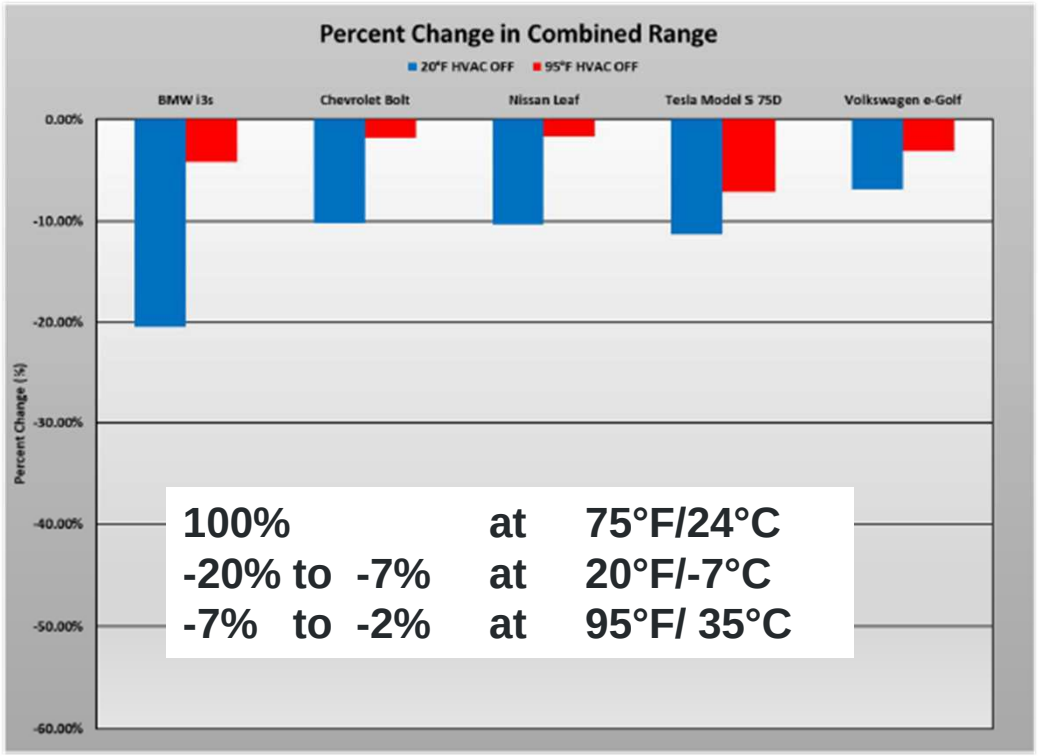


Figure 19: Percent change in combined driving range relative to testing conducted at 75°F

Image source : AAA

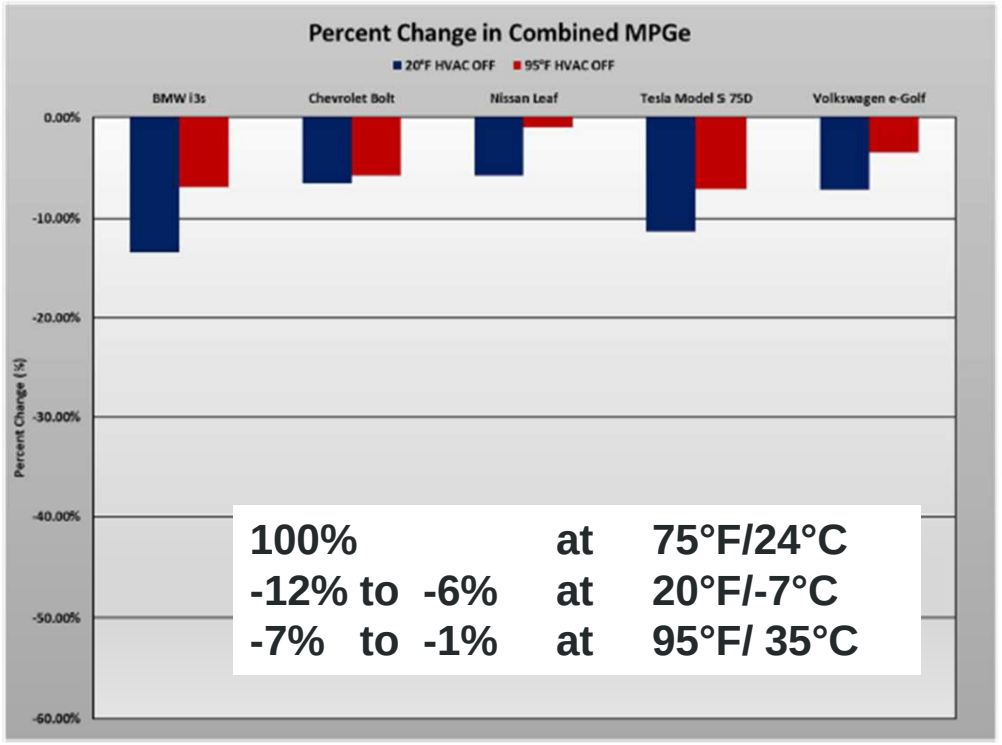
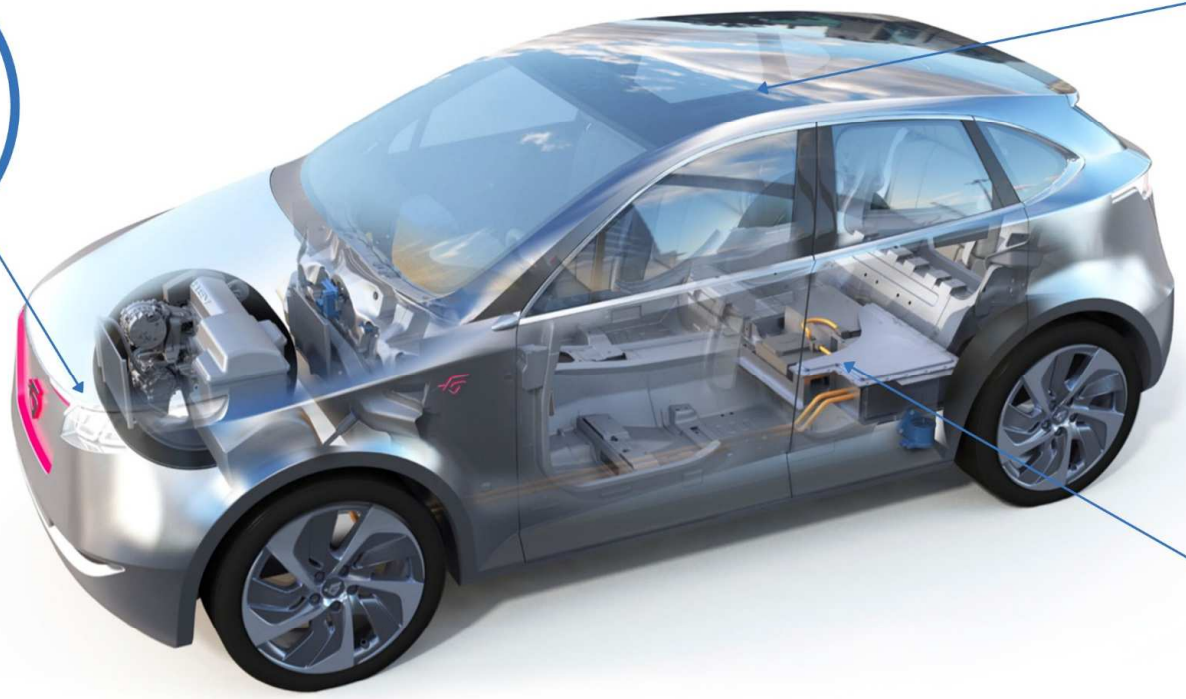


Figure 20: Percent change in combined MPGe relative to testing conducted at 75°F

Image source : AAA

Hutchinson solutions for Vehicle Thermal Management System



CO_2 Emissions reduction

Smart encapsulated oil pan

Comfort

Thermal Energy Storage

Dynamic Insulating System for Cabin

Range & durability

Dynamic Insulating System for Battery

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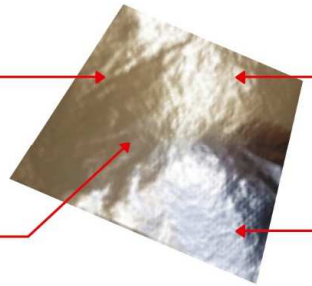
Hutchinson Ultrathin VIP: a multi feature insulating system

Product: Ultrathin VIP (vacuum insulation panel)

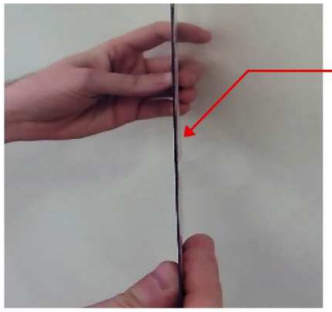
ULTRATHIN
Thickness < 2mm

SUPERINSULATING
Thermal conductivity < 15mW/(m.K)



ELECTRICAL RESISTIVITY
(6 10^14 Ohm cm)

HYDROPHOBIC
Water uptake < 0,1%

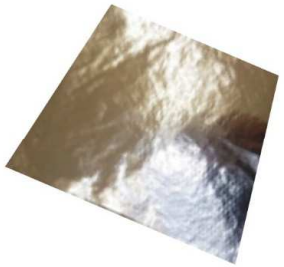


Side view
< 2mm

Features

FIRE PROTECTION
(investigations on going)

MECHANICAL PROTECTION
(composite, metal…)



2,5D SHAPE

ADHESIVE TAPE
(on one face)

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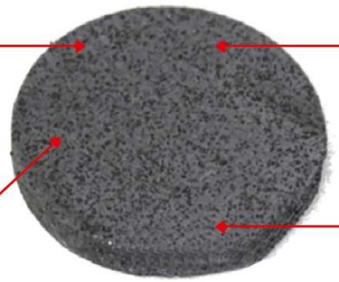
Hutchinson PCsMart : Engineered Systems for Energy Storage

Product: PCsMart

FLEXIBLE
Hardness 60 Shore A

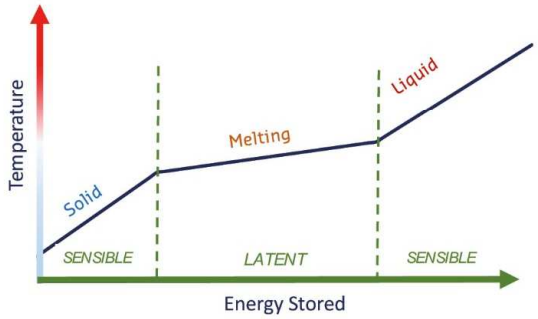
FIRE RESISTANT
UL94 VO



HIGH ENERGY DENSITY
Enthalpy 75 to 100 kJ/kg

THERMAL TRANSFER
Thermal conductivity
0,9 to 2,5 W/(m.K)

PHASE CHANGE MATERIAL



Features

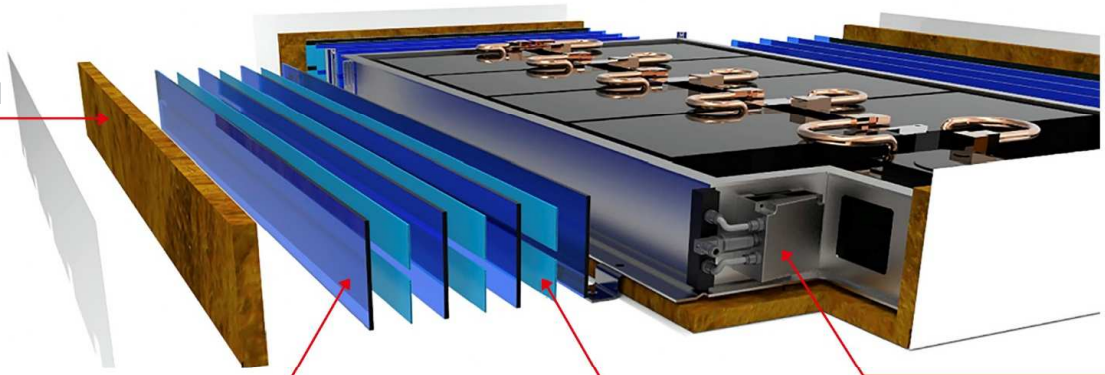
MODULARITY

3D MOLDED
UL94 V0

SHEET LAYER

Hutchinson Dynamic Insulating System (DIS) for battery thermal management

Battery: Mode OFF, Parking periods



SUPERINSULATING
Vaccum Insulating Panel

AIR FLOW MANAGEMENT
Fans

THERMAL STORAGE
Formulated Phase Change Material

TEMPERATURE CONTROL
Air Channels to reset Phase Change Material

Fitted **Efficient** **Smart** **Dynamic**

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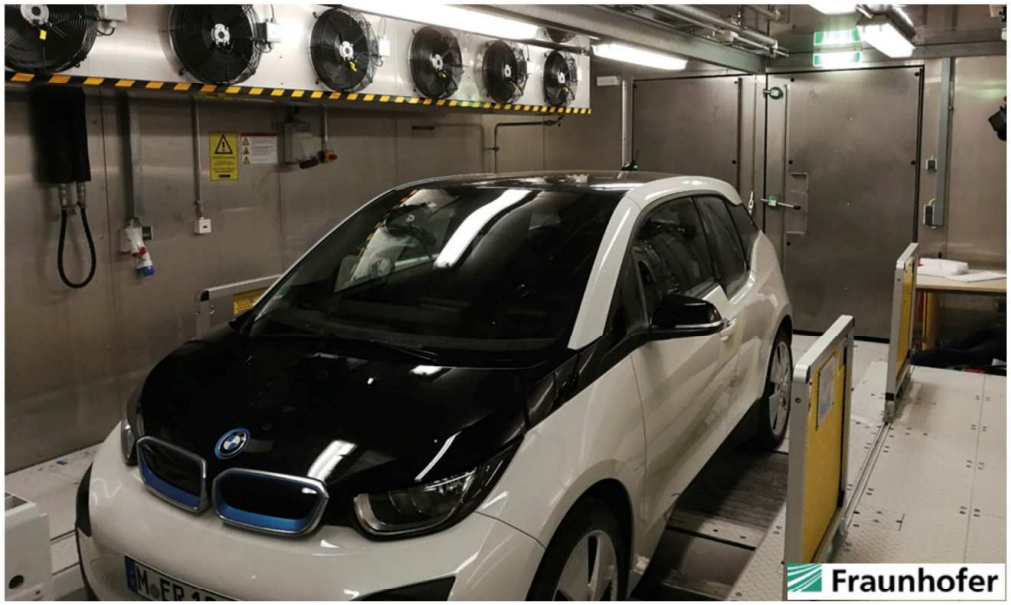
Hutchinson Dynamic Insulating System (DIS) for battery thermal management

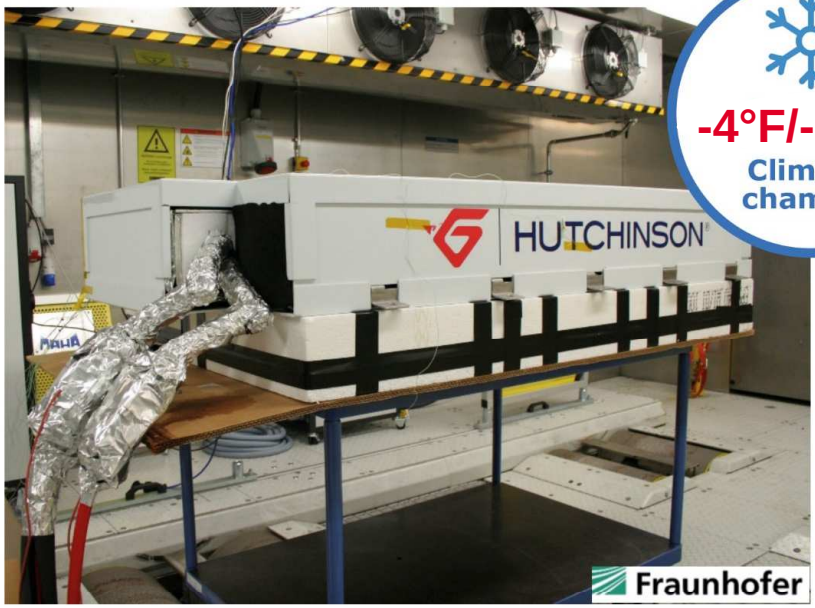
Baseline

Complete vehicle Battery Temp. measured w/o DIS



DIS

Battery outside EV Battery Temp. measured with DIS



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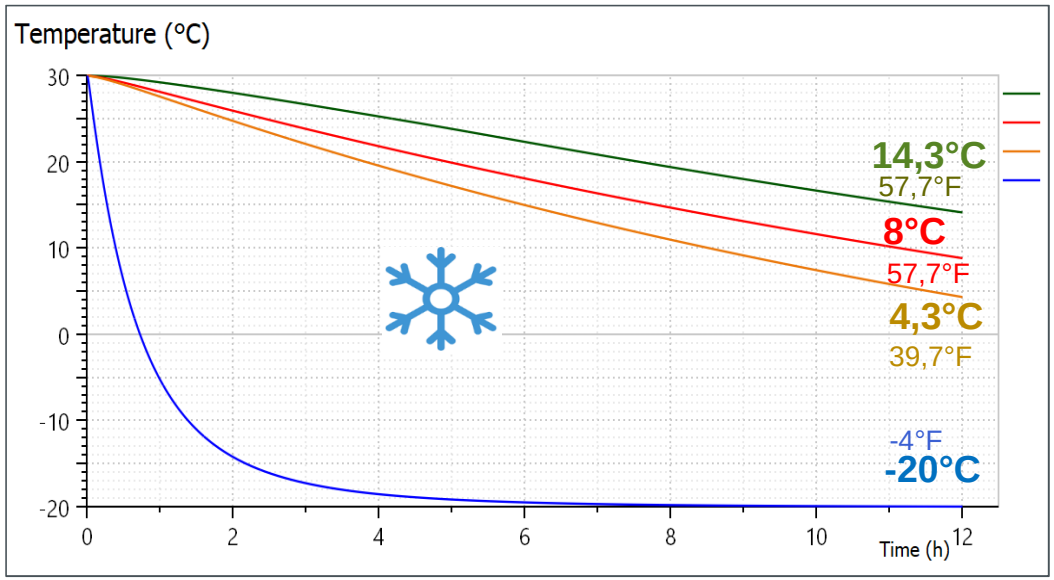
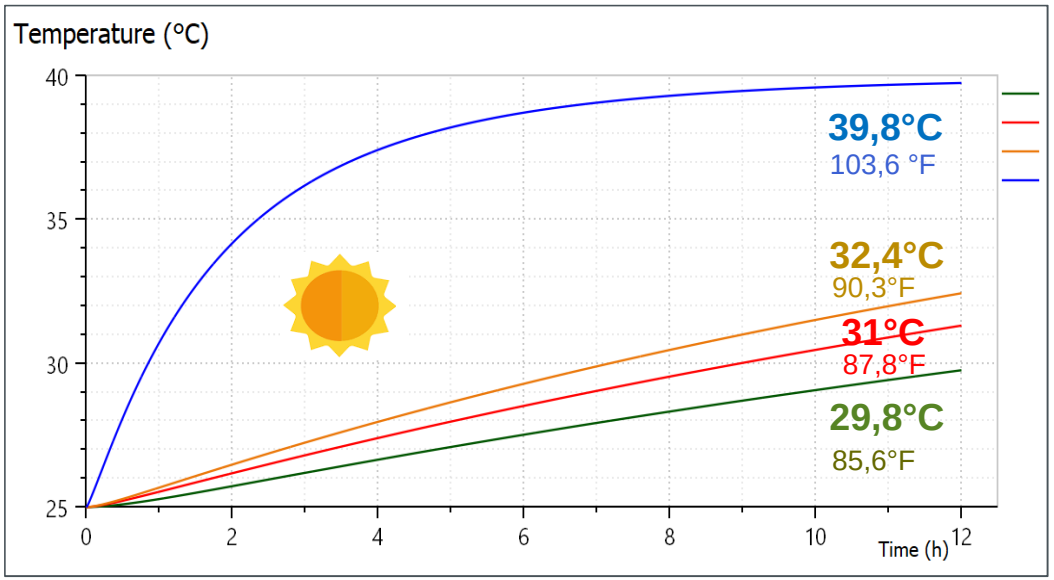
Hutchinson Dynamic Insulating System (DIS) for battery thermal management

Parking phase @ Text : -4°F/-20°C



Parking phase @ Text : 104°F/40°C



- Baseline
- DIS (VIP 20 mm + PCM 20 mm)
- Conventionnal Thermal Insulating Material (40 mm, 40 mW/(m.K))
- Vaccum Insulating Panel (20 mm, 7 mW/(m.K))

Fraunhofer IISB

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Simulations in European conditions

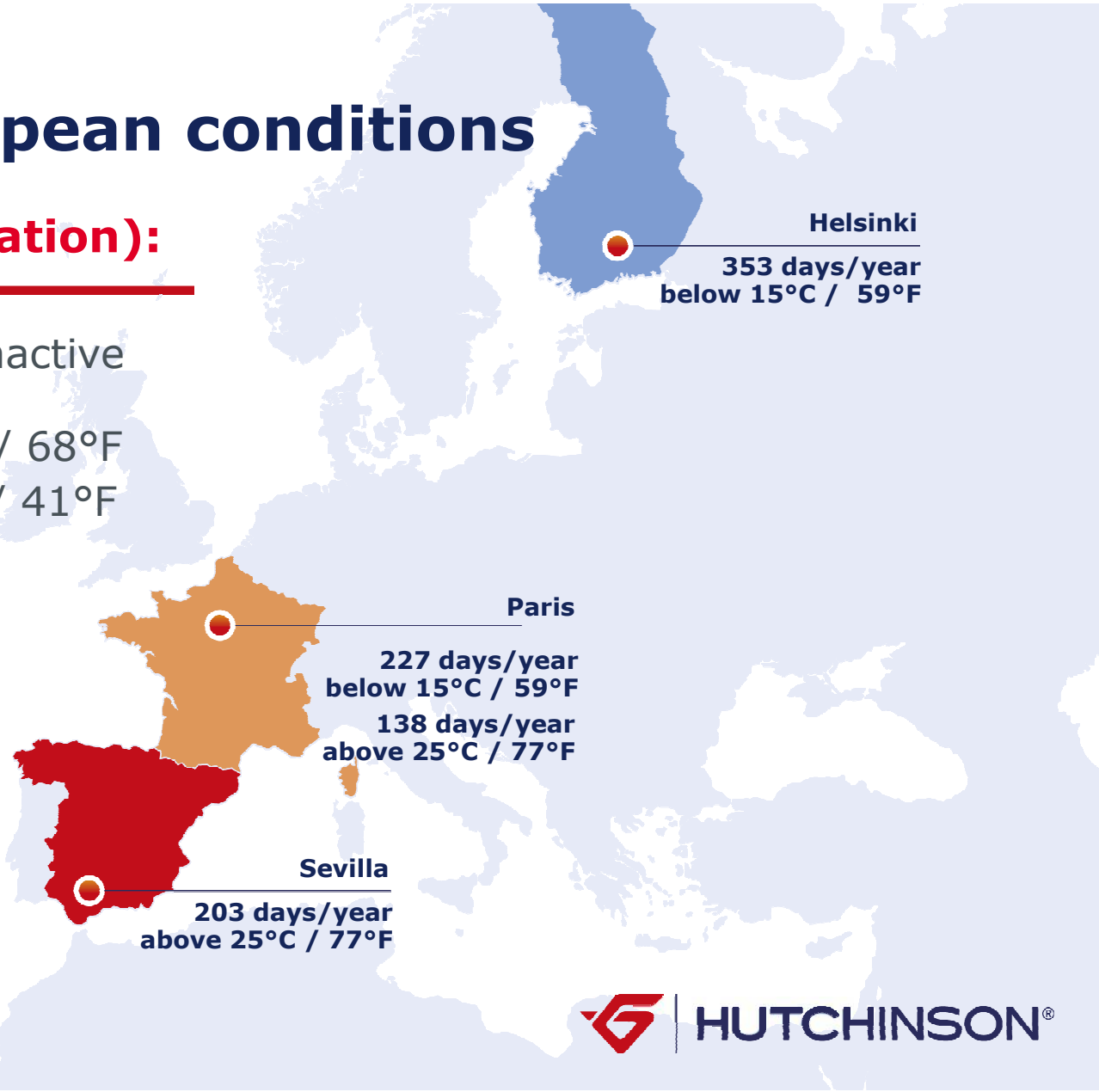
Daily cycle (Amesim simulation):

Cooling & Heating system only inactive during parking periods

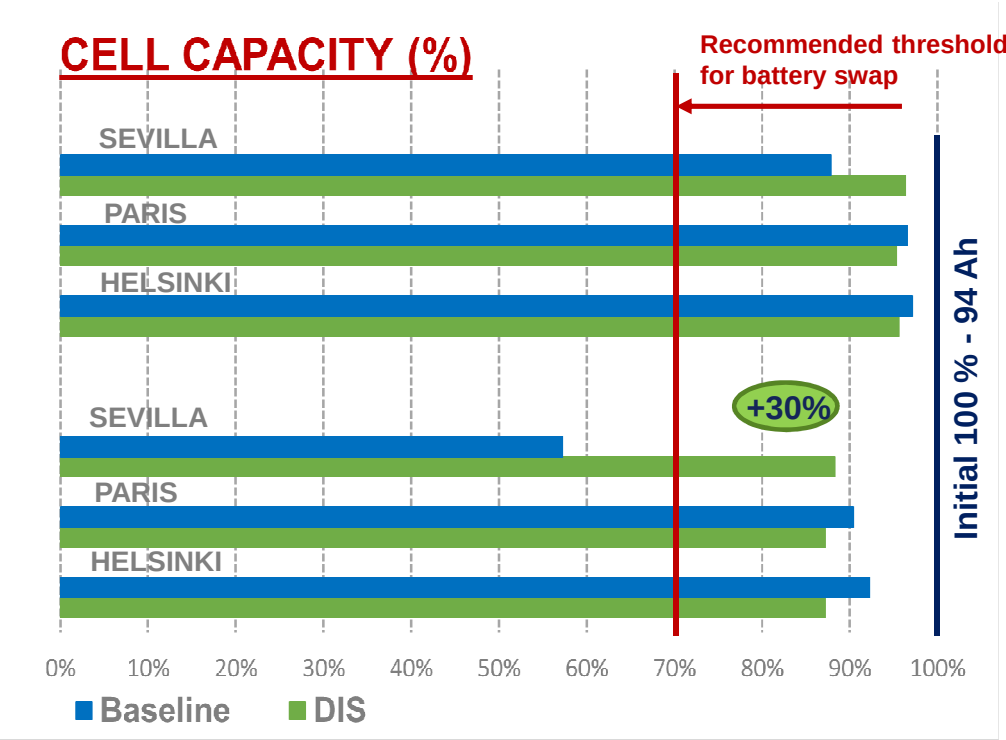
Battery T°C Set Cooling = 20°C / 68°F

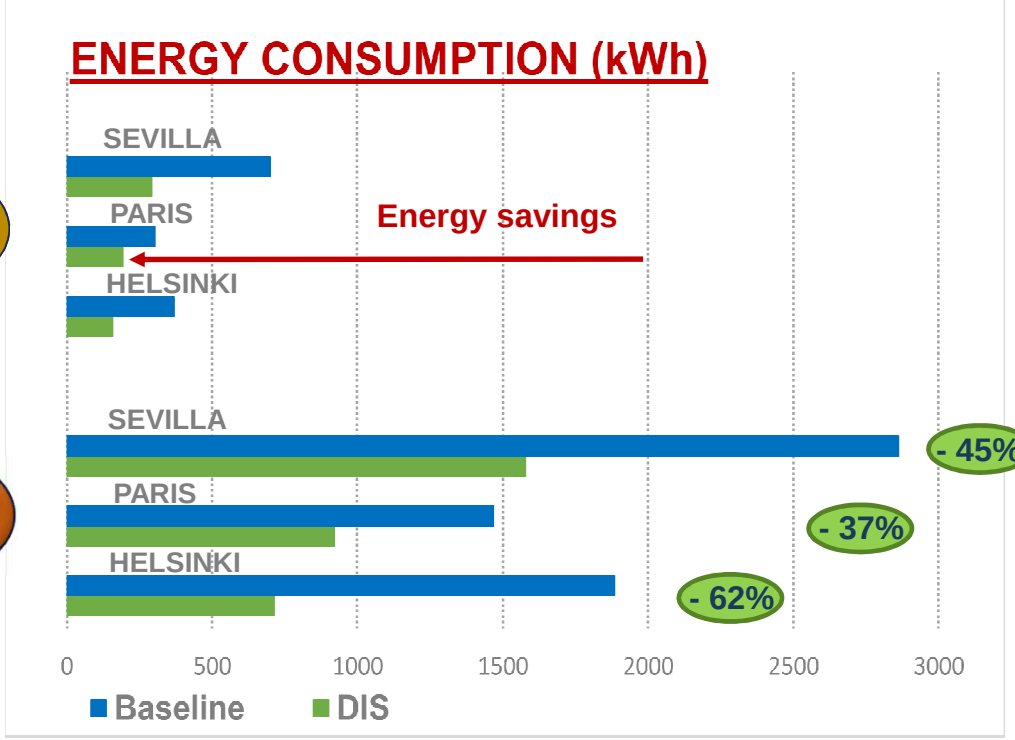
Battery T°C Set Heating = 5°C / 41°F

- 1 WLTC
- + 11h parking (work)
- + 1 WLTC
- + 12 h parking (home)
- 7 kW charging phase
- 33kWh Battery



Ageing & Energy Saving for BEV with or w/o DIS





Focus On Sevilla after 5 years :

Baseline — 154 km - 95,7 mi — 270 km – 168 mi / 33 kWh

With DIS — 238 km - 148 mi

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Ageing & Energy Saving for BEV with or w/o DIS

DIS: Positive Impacts for BEV

- **+30 km/+18,6 mi** at 14°F/-10°C to **+50km/+31 mi** at -4°F/-20°C potential additional daily range
- **+11 000 km/+6 835 mi**(1) cumulated for cold & hot conditions (5 years)
- **Optimal T°** especially for charging in extreme temperature conditions
- **+ 30% Lifetime** in hot climate

DIS: Positive Impacts for PHEV

- **Extend range** in Pure Electric Mode (test ongoing)
- **+ 25% to + 40% CO_2 Reduction** in extreme climates

(1) Eco mode 11kWh - 62 mi/100km

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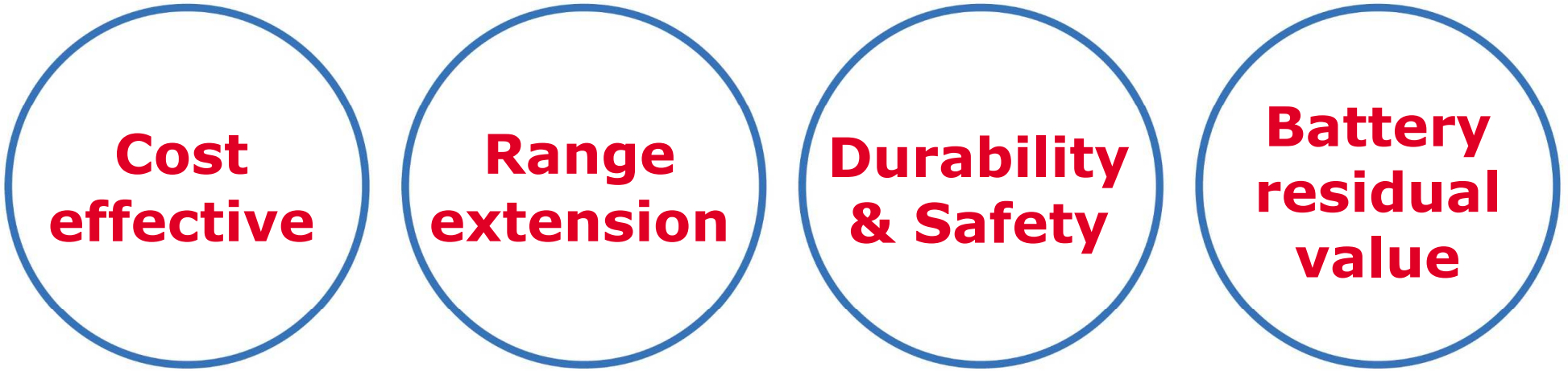
Hutchinson solutions



…Resulting in a lower TCO !

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We make it ***possible***

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