

Energy management system in electric vehicles

*„Conversion of thermal waste
to comfort and mileage“*

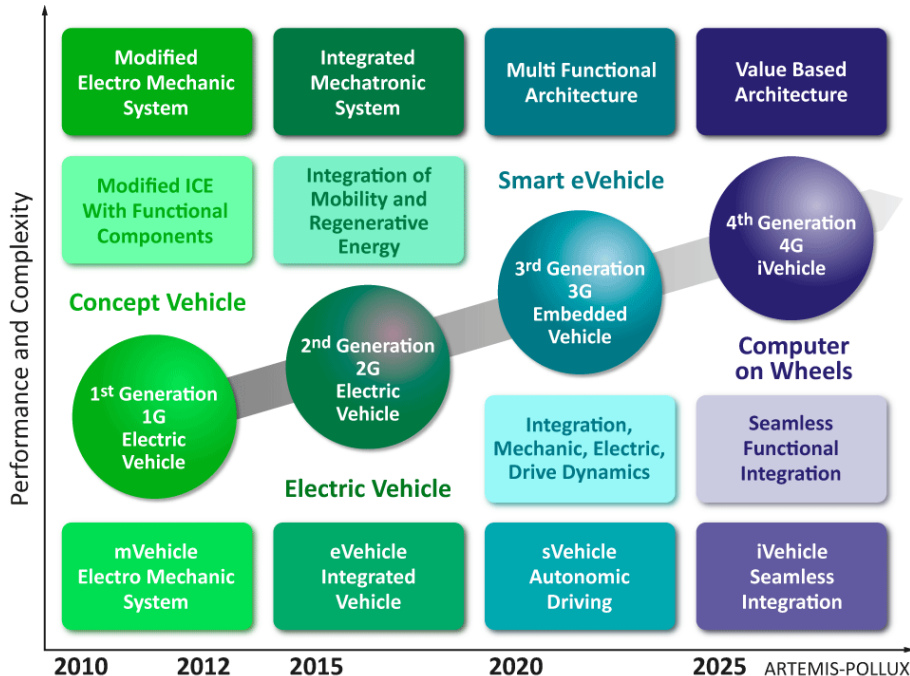
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„Conversion of thermal waste to comfort and propulsion“

■ 4th Generation EV – Value Based Architecture source Pollux project



■ EV / Hybrid - intrinsic thermal waste

- Below 100% efficiency in

- Inverters
- Propulsion (Motor)
- Battery Charging

- → HEAT dissipation ~ 1 ... 10 kW

■ Thermal conditioning requested

- Battery conditioning
- Passenger cabin ~ 2 ... 5 kW

■ Intelligent Thermal Architecture

- Heatflow from dissipation to use
- Heatpump with ~1/3 .. 1/5 electric energy generated heat / cooling

■ Target:

Value Based Architecture
to leverage the dissipated heat or use less energy for required heat

Research Modules & Expected Impact

- Predictable mileage & less costs lead to faster introduction of electric and plug-in hybrid cars.
- Cars autonomy will be increased thanks to a reduction of at least 50% of energy used for passenger comfort and at least 30% for component cooling in extreme conditions

System architecture models and algorithms

Heatflow – from
the inverter losses
to battery
conditioning

Drive range
Pre-conditioning
Control System

**Waste
converted to
use**

Heatpumps in the
EV

Heating
Cooling
Integration in the
system heatflow

**Less electrical
energy for same
result**

Hotspot
prevention in the
EV

sensing
early detection
control system

**Robustness and
Reliability**

Smart system integration for the heat flow with new heterogeneous package technologies and focus on robustness and reliability

Next Steps

- Reiner John participates in the consolidation of EGVIA interest proposals for GV2
- Infineon will set up two projects with partners on energy management systems and integration, partially consortia are already known
- Room for competition & complementary actions in the field of thermal and electric energy in the EV is seen

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