

Austrian Road Map for Battery Electric Vehicles

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Hybrid and electric vehicles, energy storage technologies
and control systems

National and international R&D-projects, research institutions and funding programs

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in cooperation with **bmw** and **arsenal research**
Ein Unternehmen der Austrian Research Centers

Motivation

- ICE driven cars produce local emissions like NO_x , C_xH_y , PM10
- Dependence on fossil fuels
- ICE efficiency only 25 – 40 %
- Noise pollution

⇒ Electric vehicles – the solution?

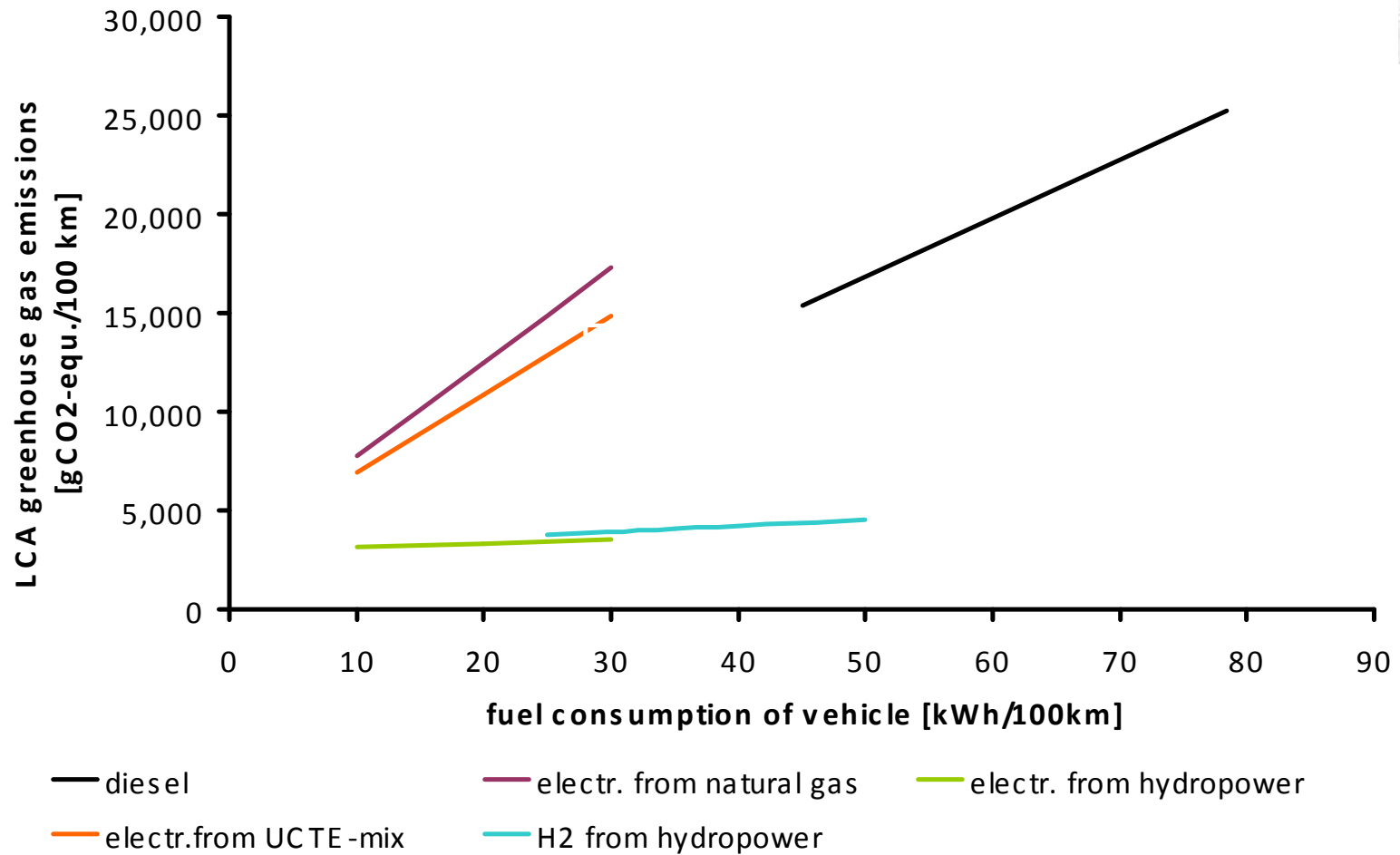
- + No local emissions
- + High efficiency of the electric traction (above 90 %)
- + Low noise
- + More primary energy options
- + Regenerative braking
- + Low maintenance effort

The challenge is the battery system (energy density, weight, charging operation, costs).

Comparison of Fuel/Energy Options

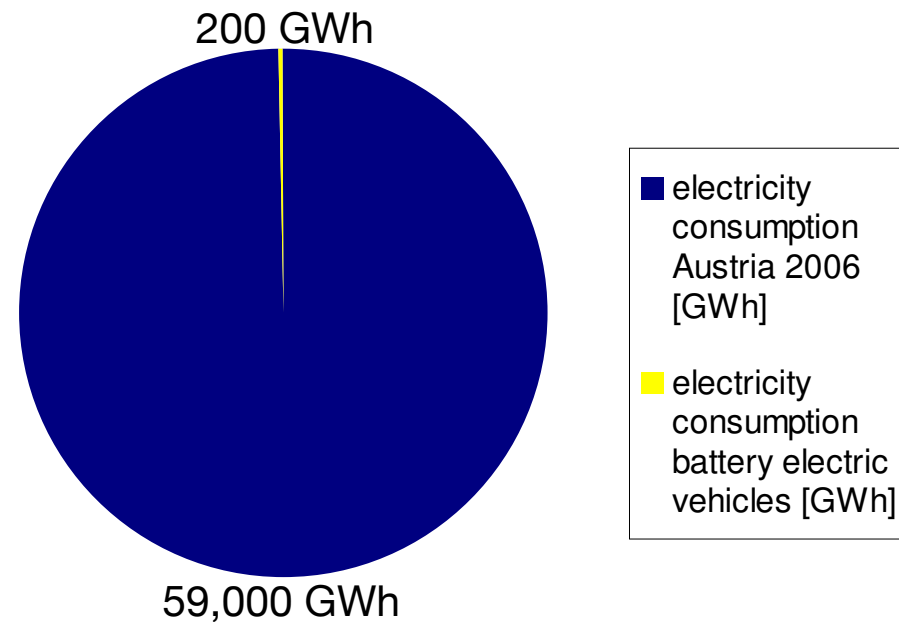
	Biofuels	Hydrogen	Electricity
Primary energy	Competition with non-energy use	Many options	Many options
Infra-structure	Existing	Not existing	Partly existing
Vehicle technology	Existing	New developments necessary	New developments necessary
Customer needs			
● Range	++	+	0
● Refuel time	++	+	-

Greenhouse Gas Emissions



Electricity consumption - Example

- 100,000 battery electric vehicles (in Austria in 2007: total 4.2 million passenger cars)
- Consumption of a battery electric vehicle: 20 kWh/100 km
- Average driving distance: 10,000 km/a
- Electricity consumption: 200 GWh/a
- Total electricity consumption in Austria in 2006: approx. 59,000 GWh



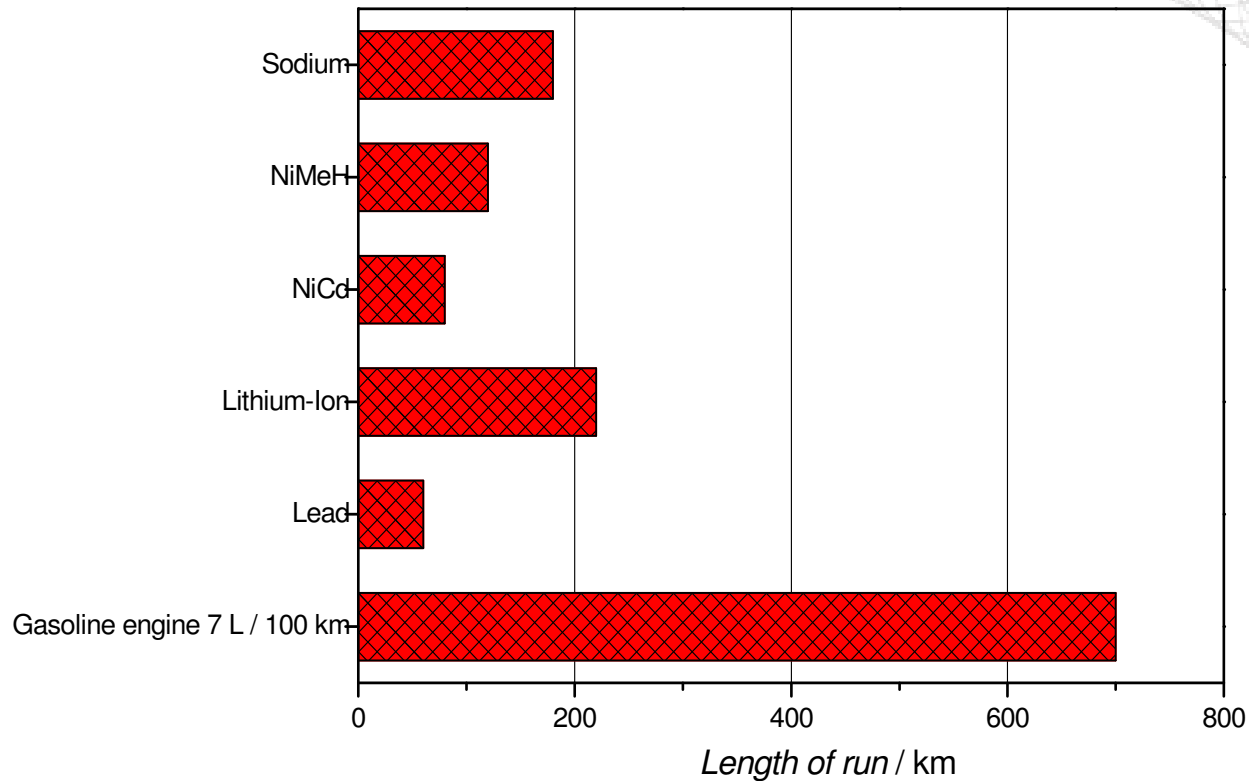
Charging station power requirements

Example

- Electricity stored in the battery electric vehicle: 20 kWh
- Charging time: 15 minutes for 100 km with a charging power of 80 kW
- Filling station for 6 vehicles
⇒ 0,5 MW
- Battery change option

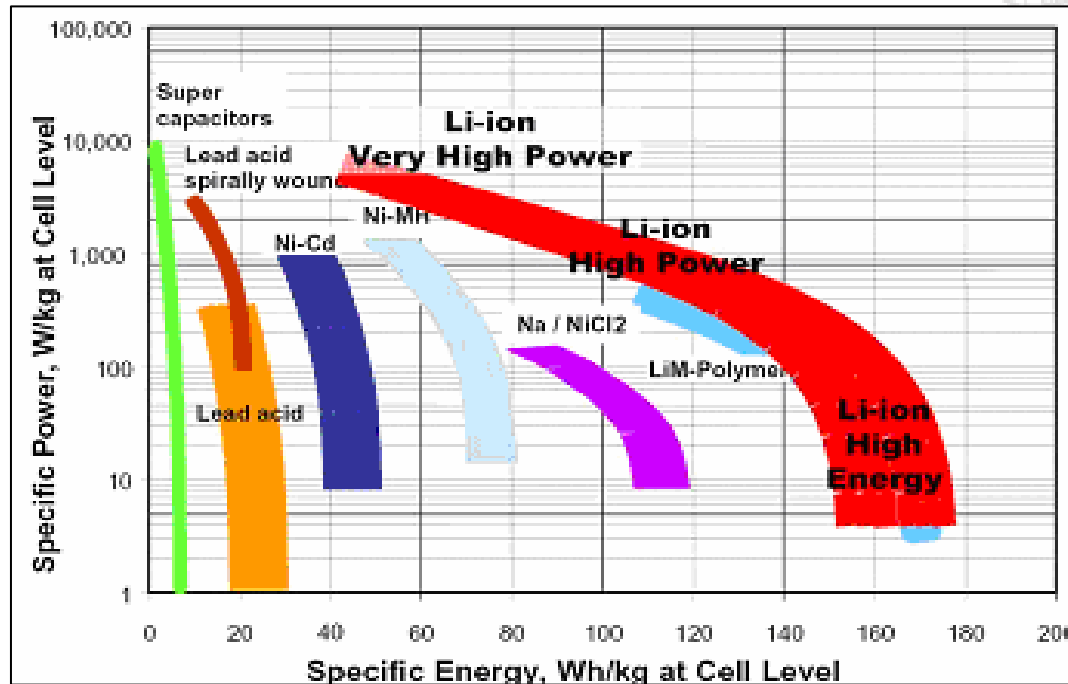


Range of Storage Options



Range of selected battery systems compared to the gasoline engine (tank volume 50 L, weight of battery 350 kg)

Characteristics of Battery Systems



Source: saftbatteries

Why Lithium-Ion-Batteries ?

⇒ Higher energy and/or power than other battery systems !

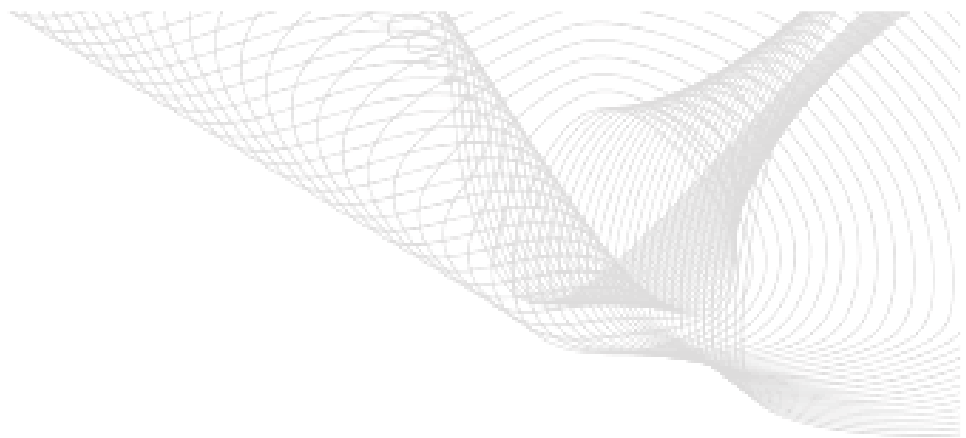
Austrian Road Map



- Development of vehicle technologies to 2020
- Development of battery technologies
- Market overview of battery electric vehicles
- Cost analysis and environmental analysis
- Requirements for the electricity infrastructure
- Implementation scenarios
- Opportunities for Austrian industry



Project Summary



- Synopsis
 - Technical, economical and ecological analysis of battery electric vehicles
 - Perspectives for the Austrian automotive and power industry
 - Austrian Road Map

● Project team:



● Funded by:



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