



RANGE EXTENDER FOR BEVS: BALANCING COST, RANGE, AND WEIGHT

Can a range extender outsmart battery-only EVs?

EFESO
MANAGEMENT CONSULTANTS

COST & VALUE ENGINEERING
INSIGHT

REEVs are at a global turning point: a technological comeback with enormous potential



REEV – Global Situation



REEV / PHEV Figures Worldwide

- **Growing global interest in REEVs** – as a bridging technology for stagnating BEV expansion
- Boosted by a strong push from China, growing interest in the USA and great potential in Europe
- **High growth in rural areas** – REEV impresses with range and charging freedom
- Subsidies previously focused on BEVs, **REEVs are moving into the political spotlight**

+72%
growth in 2024²

CHINA dominates the
global REEV market

+9,2%
p.a. by 2034 (USA)¹

REEVs are a fast-growing
EV segment

+10,4%
p.a. by 2032³

REEV show new potential
in Europe



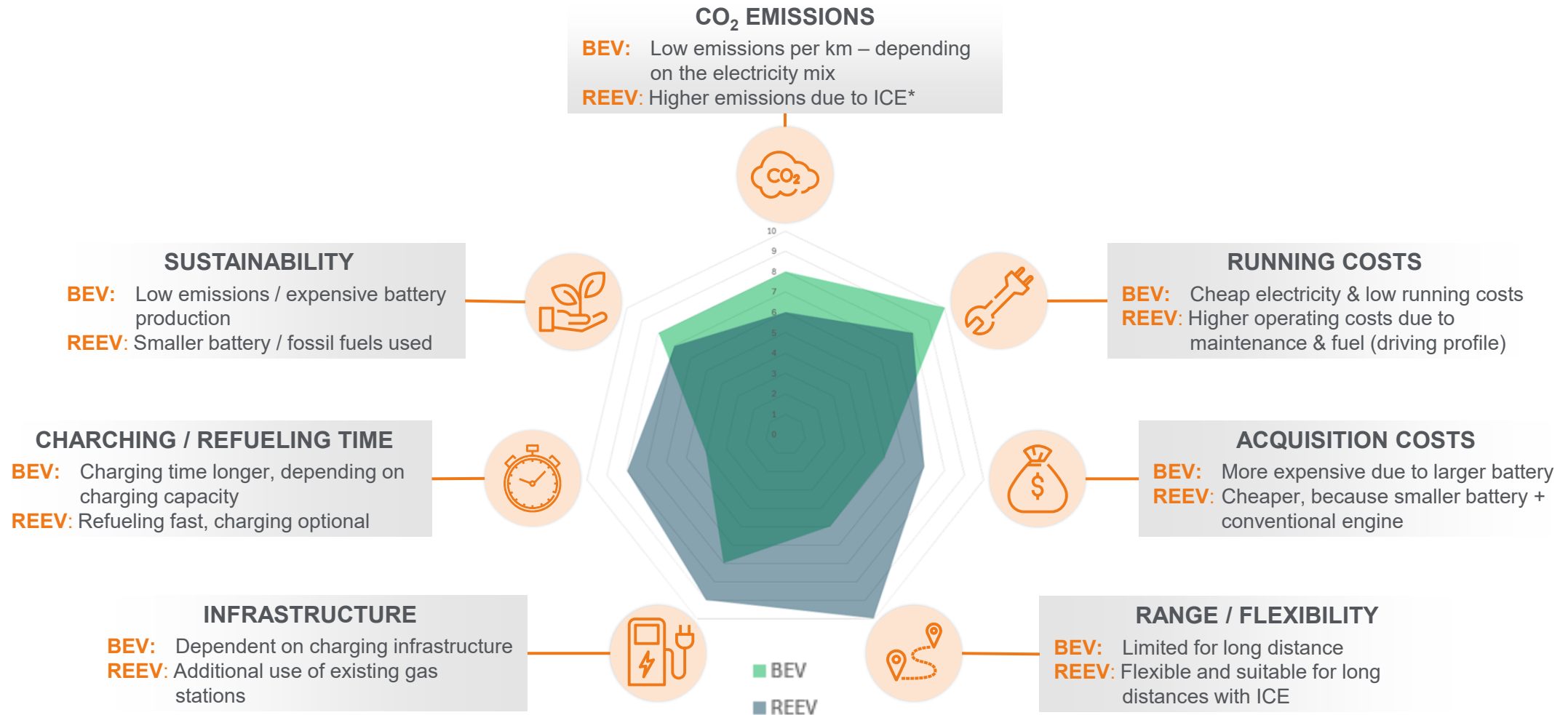
PHEV / REEV –
**global fastest
growing EV
category**



REEVs are establishing a global presence – as a dynamic interim solution for Range, Costs and Infrastructure.



Flexibility vs. idealism: where BEVs still struggle and REEVs step in



Higher rating = Better for the customer



REEVs remain a **flexible** and **valuable complement** to BEVs, despite progress in batteries and charging.



*Depending on driving style
REEV = Range Extended Electric Vehicle; BEV = Battery Electric Vehicle; ICE = Internal Combustion Engine

Which technology offers the greatest cost advantage according to the break-even analysis?

Realistic parameter:



0,35 €/kWh
Household electric



1,75 €/l
Ø Fuel price 2025



~70 %
REEV - pure electric driving



Range
REEV ~ 1000 km
BEV ~ 500 km



REEV > BEV
Maintenance



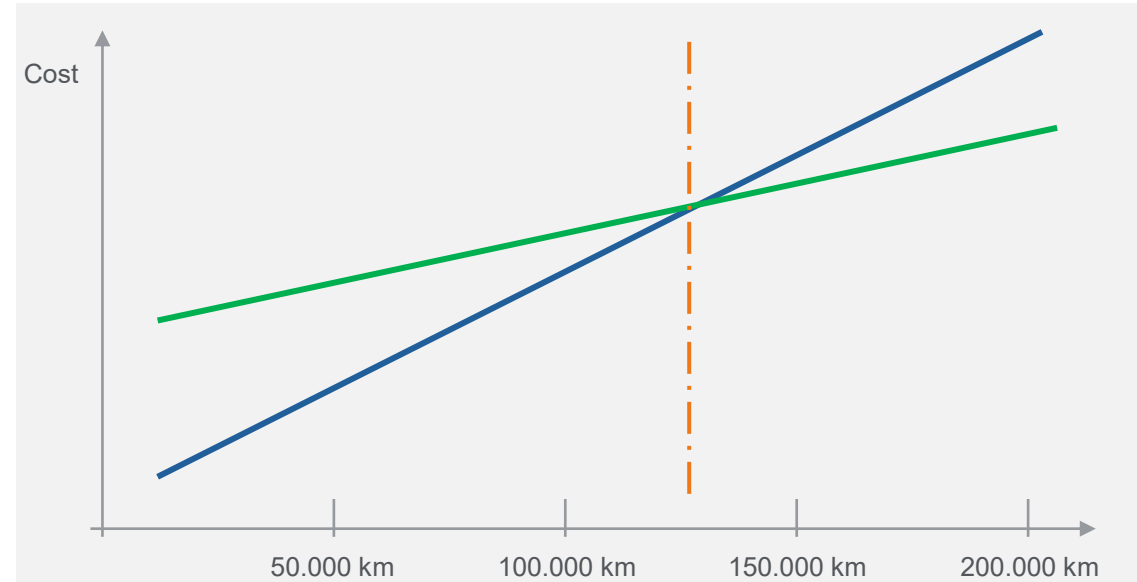
REEV < BEV
REEV benefits from smaller battery

REEV vs. BEV: cost comparison over distance per year

Break-Even

Closing (100.000–140.000 km)

- Total costs getting closer
- BEV benefits more from lower energy and maintenance costs
- Cost trend dependent on electricity and fuel prices
- REEV stays flexible due to range buffer



REEV

1. Start-up (0–100.000 km)

- Lower purchasing costs due to smaller battery and simple combustion technology
- Economical for mixed driving profiles and low annual mileage

BEV

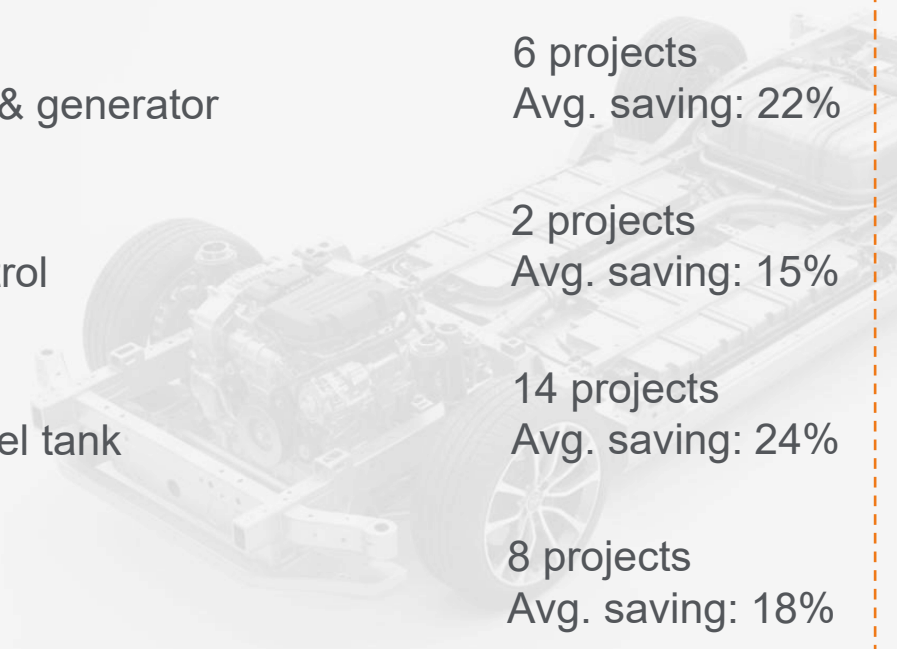
3. Long term use (>140.000 km)

- In the long term, the BEV is economically superior - especially with high mileage and stable electricity costs.
- REEV stays flexible in case of charging uncertainty

REEV starts with a cost advantage, BEV wins on long range.

EFESO's track record: delivering up to 24% cost savings across automotive projects

Our projects



» Electric drive system Battery / electric motor & power electronics	15 projects Avg. saving: 12%
» Range Extender - Modul Internal combustion engine & generator	6 projects Avg. saving: 22%
» Intelligent system Energy management & control	2 projects Avg. saving: 15%
» Charging and fuel system On-board charging unit & fuel tank	14 projects Avg. saving: 24%
» Thermal management Cooling circuits & sensors	8 projects Avg. saving: 18%

Why us?

- We are looking back onto more than **20 years' experience** in profitability programs and have supported our clients in various areas to improve their profitability.
- Our **integrated approach** of top-level consulting and bottom-up cost and technology knowledge is a major enabler of successful improvement programs.
- We promote **x-functional collaboration**, motivate teams and align the project organization towards target achievement.
- Our **specific toolboxes** combined in an overarching approach enable us to improve project performance. These toolboxes allow a customizable combination of various methods:
 - › Product costing
 - › Product design
 - › Purchasing
 - › Operations & supply chain
 - › Sustainability / CO₂

