Electric Vehicles:
A few key considerations

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Electric Vehicles: Key considerations

We promote all technologies of electrically powered vehicles (EVs):

1. Battery Electric Vehicles (BEVs) (= pure electric vehicles),
2. Extended Range Electric Vehicles (EREVs) (= Series Plug-in Hybrids),
3. Fuel Cell Vehicles (FCVs, fuelled by hydrogen).

because they are ***by far*** the most sustainable:

petrol-free, no urban pollution, 1.5 less primary energy, 2.5 less CO_2…

80% of cars mileage = short trips, slow speed, 1 occupant:

→ Small/ultra-small BEVs are ideal for this usage…

→ EREVs are fine for long trips – and FCVs even better!

BEV & EREV technologies are mature enough to fill all car markets.

What is missing for EVs to spread is:

1. Initial incentives from public authorities (financial AND non-financial),
2. Charging infrastructure (first priority is where EV drivers live),
3. Attractive EV models (which will only arrive after 1. & 2.).

Comparison EVs versus ICVs

EVs (BEVs, EREVs & FCVs) are MUCH cleaner than ICVs.

Compared to conventional vehicles of same power and weight:

- **EVs use about 33% less primary energy**
  - An electric car charged with petrol/biofuel-generated electricity uses about 33% less petrol/biofuel than an ICV...
- **EVs cause 60% less CO_2 with the EU average electricity mix**
  - Even less CO_2 as electricity generation gets cleaner (which is happening).
  - Over 10 times less CO_2 in Norway, Sweden, France...
  - Same CO_2 in the worse case (coal fired power plants).
- **EVs are silent and cause zero urban pollution**
  - It is easier to reduce pollution from a few power plants than from millions of cars.
  - Reducing urban pollution saves health and building cleaning costs.
- **EVs reduce energy dependency**
  - About 30% of world's petrol is used in road transport.
  - Electricity generation uses a variety of energies (including renewable) and little petrol.
- **EVs have a sustainable life cycle**
  - EVs, batteries and fuel cells are very recyclable

ICVs have a limited improvement potential

Introducing EVs brings MUCH more benefits than improving ICVs

Figures below show the impact on ***car related*** emissions, consumption and pollution:

Improvement in:	CO_2 emissions	Petrol consumption	Urban pollution
1.a: ICVs: 160 → 130 g CO_2/km	19%	19%	±19%
1.b: 10% Biofuels in automotive*	5%	10%	±0%
1: Both above measure combined	**23%**	**27%**	**±23%**
2: Replacing ICVs by BEVs & EREVs**	**53%*****	**85%**	**>95%**

* Assuming biofuels save 50% greenhouse gas emissions and 100% petrol consumption.

** Assuming a mix of 25% large BEVs, 25% ultra-small BEVs and 50% EREVs.
Figures would further improve if EREVs were replaced by FCVs.

*** 53% with European 2006 average electricity mix (443 gCO2/kWh – source: JRC);
85% with zero-CO2 electricity (renewable, CCS, nuclear);
0% with coal-fired electricity (1000 gCO2/kWh).

➔ ***EVs are THE ONLY WAY toward a clean, energy-efficient, petrol-free car future.***

➔ ***Given the world concerns, EVs ARE the future.***

➔ ***Improving ICVs is investing in a soon-to-be obsolete technology!***

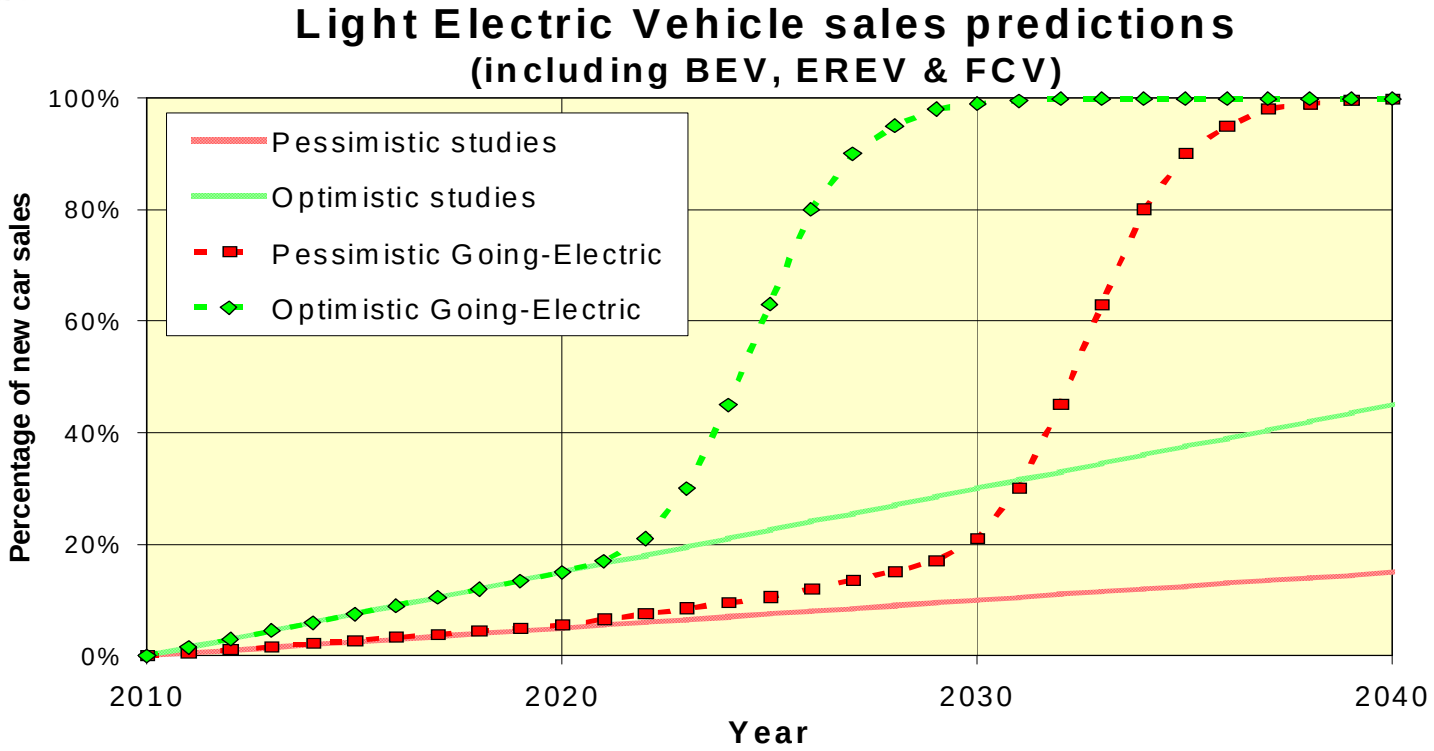
Battery Electric Vehicles:
Small is even cleaner!

Lumeneo Smera
86 cm wide, 30 kW, 450 kg, 130 km/h
The fastest city car in the world!

REVA (quadricycle)
132 cm wide, 15 kW, 570kg, 80 km/h
Perfect family car for the city!

Reduction of traffic and parking congestion:
Objectively ideal for commuting & urban environments!

EV (BEV, EREV & FCV): car sales predictions



Because:
- High production volumes and rising petrol prices will make cost of EV ownership advantageous.
- Cities will restrain petrol vehicles: health and building renovation costs...

State incentives for EVs

China

Government grant:
Manufacturer: **€5700**/E-car.
EV buyers: **€368**/E-car.
+20% in 5 major cities.

€11.4 billion for development and production of EVs.

29 million electric two-wheelers in 2009.
Forecast of **4 million** electric cars by 2012.

USA

Federal income tax credit:
- **$7,500**/E-car,
- **$2,500**/E-2/3-wheeler.

Additional incentives in many states.

$5 billion grant to electrify US transport (including 2.4 for EV battery and component plants).

$20 billion in loans for EV-related companies.

Norway

Tax exemptions for EVs:
- No registration tax (±70% of car's price),
- No VAT,
- No annual road tax…

Additional benefits:
- Free parking in public areas,
- Free use of bus lanes,
- Free use of toll roads,
- Free use of highway ferries,
- No congestion charge in Oslo.

Electric Vehicles: Conclusions

- **EVs are the future, with or without the European industry.**
- **Petrol vehicles will become obsolete in 2 or 3 decades.**
- **Asian countries (esp. China & Japan) and the USA:**
  - Are the leaders in batteries and fuel cells technologies.
  - Have allocated significant budgets to strengthen their EV leadership.

- **Europe must invest in EVs for its car industry to remain competitive:**
  - By providing charging infrastructure and initial incentives to EV buyers,
  - By stimulating investments in EV and parts production plants,
  - By intensifying R&D funding in battery and fuel cell technologies,
  - By enabling large scale fuel cell demonstration projects,
  - By promoting training in EV related skills (electronics, chemistry…),
  - By abandoning regulations forcing European car manufacturers to invest in petrol vehicles improvements (such as Euro 6 norms), in exchange for regulations forcing the development of EVs.

Recommendations for EU institutions

- **Presidency, DG Move and DG Clima:**
  - Declare EV leadership a TOP priority for Europe.
- **DG Enterprise:**
  - Abandon regulations forcing European car manufacturers to invest in petrol vehicles improvements (such as Euro 6 norms), in exchange for regulations forcing the development of EVs.
  - Stimulate investments in EV and parts production plants.
  - Fund large scale fuel cell demonstration projects.
- **DG Research:**
  - Intensify R&D funding in battery and fuel cell technologies.
- **DG Regio:**
  - Stimulate regional investments in charging infrastructure.
  - Stimulate regional incentives for EV users (financial and non-financial).
- **DG Education**
  - Promote training in EV related skills (electronics, chemistry…).