

ELECTRIC VEHICLE: A TENTATIVE ECONOMIC AND ENVIRONMENTAL EVALUATION

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Figure 1 - Diagrammatic presentation of the Model

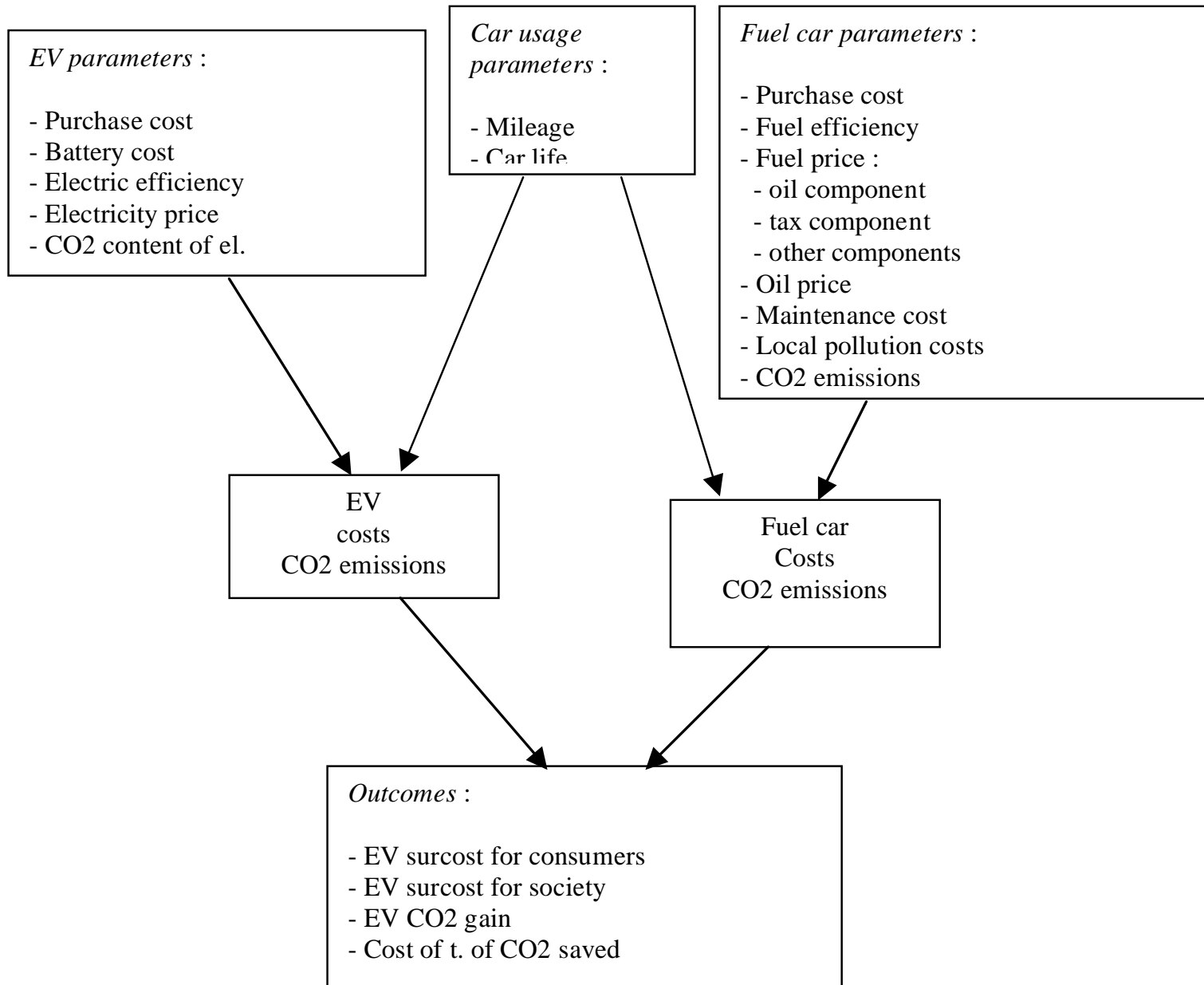
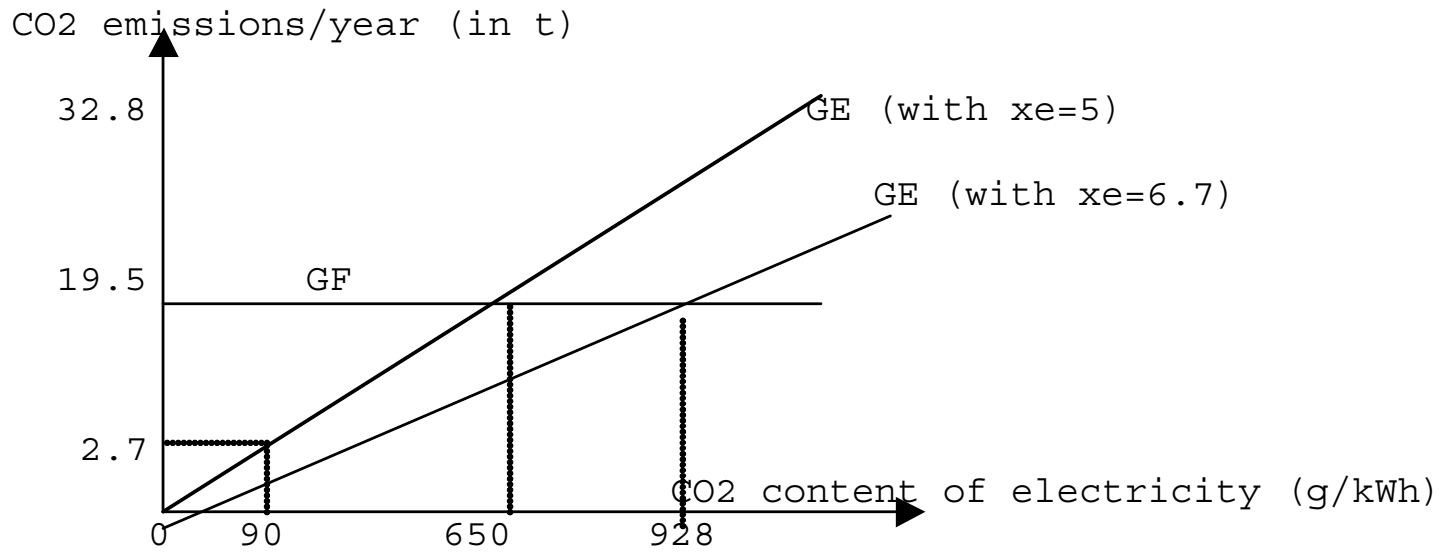


Table 3 - Value of Parameters Used in the Baseline Case

Number of years (n)	15
Car usage (k), in km/year	10,000
Social rate of discount	4%
Fuel car :	
Purchase cost (If), in €	12,000
Fuel efficiency (xf), in km/liter	20
Oil price (po) in year 1, in \$/barrel	75
Yearly change in oil price (%)	6%
Fuel taxes (t), in €/l	0.512
Other fuel costs (z), in €/l	0.193
CO2 emissions (gf), in kg/l	2.6
Local pollution costs in year 2011 (€/km)	0,006
Yearly change in local pollution costs (%)	-4.5%
Electric car :	
Purchase cost (Ie), in €	20,000
Battery cost present value (B), in €	10,007
Electricity efficiency (xe), in km/kWh	5
Electricity price (pe), in €/kWh	0.11
Yearly change in electricity price (%)	0%
CO2 content of electricity (c), in g/kWh	90

Figure 2 - CO2 Emissions of Fuel and Electric Cars, as a Function of the CO2 Content of Electricity



- **Table 4 - Present Value of Fuel and Electric Car Usage, for Consumers over a 15 Years Period, Baseline Case**

- (in €)
-
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	Fuel car	Electric Car	Difference
• Purchase cost	12,000	20,000	+8,000
• Battery cost	-	10,007	+10,007
• Fuel or electricity cost	7,623	2,446	-5,177
• Difference in repair costs	778	-	-778
• Total cost	20,401	32,453	+12,053

- *Source* : See text and Table 3 for the values given to the various parameters. *Note* : The total cost is not quite total since it does not include costs common to the two types of cars, such as parking, insurance or repairs (only the surcost for the fuel car is given) because we are only interested in differentials.

- **Table 5 - Outcome Changes Generated by Possible Changes in the Value of Key Parameters**

	Consumer surcost (€)	Economic surcost (€)	CO2 gain (Tons)	Cost of CO2 gain (€/ton)
• Baseline case	12,100	14,400	16,8	860
• Rate of discount: 2% ^a	12,600	15,300	16,8	910
• Rate of discount: 6% ^a	11,600	13,600	16,8	811
• (a) Fuel taxes: +100% ^b	9,200	14,400	16,8	860
• Oil prices: +12%/year ^c	10,000	12,400	16,8	740
• Electricity prices: +10%/year ^d	14,400	16,800	16.8	1,000
• (b) Electr. efficiency: +30% ^f	11,500	13,800	17.6	790
• (c) Yearly mileage: +30% ^g	10,500	13,000	21,8	620
• (a)+(b)+(c)+changes car prices ^h	2,564	9,283	22,7	410

- **Notes:** All cost numbers have been rounded to the nearest 100, to facilitate the reading of the results. ^aAs opposed to 4% in the baseline case. ^bFrom 0.512 to 1.024 €/litre. ^cfrom 75 \$/barrel in year 1 to 285 \$/barrel in year 15. ^dFrom 0.11 €/kWh in year 1 to 0.42 in year 15. ^e400 g/kWh as opposed to 90 in the baseline case. ^f6.5 km/kWh instead of 5. ^g13,000 km/year instead of 10,000. ^hlower electric car price (19,500 instead of 20,000) and higher fuel car price (15,000 instead of 12,000)

- **Table 8 – Outcomes Generated by Improved Electric Vehicles**

	Consumer surcost (€)	Economic surcost (€)	CO2 gain (t)	Cost CO2 gain (€/t)
• Present Vehicles (baseline case)	12,100	14,400	16.8	856
• Future vehicles :				
• (A) Initial cost : -30%	6,100	8,400	16.8	498
• (B) Battery cost : -30%	9,000	11,400	16,8	677
• (C) Electricity efficiency : +50%	10,800	13,200	18,2	723
• (D) (A)+(B)+(C) together	1,800	4,100	18,2	226
• (E) (D) + Oil prices : =12%/year	-200	2,141	18,2	118

- *Notes* : Numbers have been rounded to the nearest 100 to facilitate reading. In the baseline case, the initial cost is 20,000 €, the battery cost is 900€/year, the electric efficiency is 5 km/kWh (20 kWh/100 km), and the oil price is 75 \$/barrel. A 12% per year increase in the oil price means 367 \$/barrel in year 15.

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