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EU and UK Automotive TCO

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January 2021

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European Union and UK Automotive ICE vs EV Total Cost of Ownership

OBJECTIVES

- Global Automotive TCO Program ICE vs. EV for US, EU and AP region to start with US first, followed by EU and then AP.
- This report is the total cost of ownership program for EU and UK focuses on the understanding automotive cost of ownership in EU and UK of comparable internal combustion engine vehicles and electric vehicles

EU AND UK AUTOMOTIVE TOTAL COST OF OWNERSHIP SCOPE

- Three different geographies: France, Germany and UK
 - Subsidies
 - Utility rates
 - Differential Costs
- Vehicles – Small, Mid-size and Luxury – Included in Study
 - Small Cars
 - Peugeot 208 and e208
 - Mid-size SUV or Car
 - VW New Golf, VW e-ID3
 - Luxury Car
 - Tesla Model S, BMW 5 series
- Acquisition Cost Options
 - Vehicle Costs
 - Financing or lease costs
 - Home Charger Station
- Subsidies
 - Country
- Vehicle Life
 - 3 years – short-term owner
 - 7 years – average vehicle ownership
 - 10 years – long-term ownership
- Driving Distance
 - EU average driver ~ 55 Km/day or 20,000 Km/year
 - EU High Mileage Driver ~120 Km/day or 44,000 Km/year
- Fuel Cost
 - Diesel high penetration in EU and UK
 - Home Utility Price – home based charging 90%
 - 100% Public Chargers – no home base charging
- Maintenance
 - Oil and Filter Change
 - Tire Rotation and Replacement
 - Multi-point Inspection
 - Brake Pad & Rotors
 - Other
- Expected Residual Value
 - 3 years – short-term owner
 - 7 years – average vehicle ownership
 - 10 years – long-term ownership
- TCO Categories
 - Vehicle Cost
 - Fuel
 - Maintenance
 - Total

EU AND UK AUTOMOTIVE TOTAL COST OF OWNERSHIP PROJECT

- ① Data was developed from multiple sources and most data points had 3-4 sources to establish accuracy
 - ① Based on data access for EU and UK we included all 6 vehicles listed in the project
 - ① Based on availability of electric vehicles in all classes small cars were added to the EU and UK TCO analysis
 - ① VAT is included in vehicle MSRP, Registration and Vehicle taxes are combined as most of the countries have linked registration, taxes based on CO₂ and HP levels
 - ① Leasing for personal vehicles is mainly done for fleet vehicles in France and Germany, so analysis done only for UK
 - ① For electric vehicles separate models were developed for home charging and public charging
 - ① 3, 7 and 10 year models were developed for both low and high mileage
 - ① Data sources include OEM websites, Autosphere.Fr, country and utility websites and others.
 - ① Averages of the data were used for modeling when a range was established from the sources

TOTAL COST OF OWNERSHIP EU AND UK INSIGHTS AND FINDINGS

- ⌚ Subsidies have a major impact closing the gap for TCO as the EU subsidies can reach 20% of purchase price of EV.
- ⌚ All EVs have significant advantages in 3-year analysis based on subsidies, residual value, lower fuel and maintenance costs
- ⌚ Small and Mid-size EVs have significant advantages for all periods – 3yr, 7yr and 10yr based on subsidies, residual value, lower fuel and maintenance costs
- ⌚ Extreme gap in purchase price in luxury vehicles drive 7yr disadvantage to EV for low mileage, high mileage overcomes this difference with lower fuel and maintenance costs to reach parity
- ⌚ Home chargers are less expensive in the EU and UK than the US due to higher voltage systems being common and subsidies for home charging further reduce the investment.
 - ⌚ Due to low costs of home chargers – fuel from public chargers is not competitive for low or high mileage at short or long terms
- ⌚ Small diesel vehicles have lower residual values than EVs, mid-size or luxury cars.
- ⌚ Luxury and Midsized EVs are at a cost disadvantage with ICE vehicles for 3 yr. leases, however the cost per year is substantially higher than ownership
- ⌚ Subsidies from the EU and UK government are higher now with the governmental stimulus in 2021
- ⌚ Fuel from home chargers and vehicle maintenance costs for electric vehicles are about 50% of the internal combustion engine vehicles
 - ⌚ Questions remain on how highway taxes are levied for electric vehicles as a significant portion of highway funding comes from tax on diesel and petrol.



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SMALL CAR PURCHASE - FRANCE

Peugeot - 208

	3yr		7yr		10 yr	
	Low Mileage	High Mileage	Low Mileage	High Mileage	Low Mileage	High Mileage
Vehicle Costs	€ 1,253	€ 3,490	€ 20,796	€ 21,914	€ 22,664	€ 23,782
Fuel Costs	€ 2,872	€ 6,266	€ 6,702	€ 14,622	€ 9,574	€ 20,888
Maintenance Costs	€ 2,400	€ 3,000	€ 8,400	€ 10,920	€ 12,900	€ 16,770
Total Cost	€ 6,525	€ 12,756	€ 35,897	€ 47,456	€ 45,138	€ 61,440

Peugeot - e208

	3yr		7yr		10 yr	
	Low Mileage	High Mileage	Low Mileage	High Mileage	Low Mileage	High Mileage
Vehicle Costs	€ 2,052	€ 3,167	€ 25,904	€ 27,018	€ 27,747	€ 30,115
Fuel Costs	€ 2,054	€ 3,655	€ 3,860	€ 7,595	€ 5,214	€ 10,550
Maintenance Costs	€ 1,200	€ 1,560	€ 4,200	€ 5,460	€ 6,450	€ 8,385
Total Cost	€ 5,306	€ 8,381	€ 33,964	€ 40,073	€ 39,411	€ 49,050

MID-SIZE CAR PURCHASE - FRANCE

VW New Golf

	3yr		7yr		10 yr	
	Low Mileage	High Mileage	Low Mileage	High Mileage	Low Mileage	High Mileage
Vehicle Costs	€ 2,975	€ 5,919	€ 28,503	€ 29,975	€ 32,287	€ 33,171
Fuel Costs	€ 3,869	€ 8,440	€ 9,027	€ 19,694	€ 12,895	€ 28,135
Maintenance Costs	€ 2,400	€ 3,120	€ 8,400	€ 10,920	€ 12,900	€ 16,770
Total Cost	€ 9,243	€ 17,479	€ 45,930	€ 60,589	€ 58,082	€ 78,075

VW – eID3

	3yr		7yr		10 yr	
	Low Mileage	High Mileage	Low Mileage	High Mileage	Low Mileage	High Mileage
Vehicle Costs	€ 2,348	€ 3,668	€ 30,553	€ 31,872	€ 32,712	€ 35,516
Fuel Costs	€ 1,897	€ 3,312	€ 3,493	€ 6,794	€ 4,690	€ 9,405
Maintenance Costs	€ 1,200	€ 1,560	€ 4,200	€ 5,460	€ 6,450	€ 8,385
Total Cost	€ 5,445	€ 8,539	€ 38,246	€ 44,126	€ 43,852	€ 53,306

LUXURY CAR PURCHASE - FRANCE

ICE – BMW 5 Series

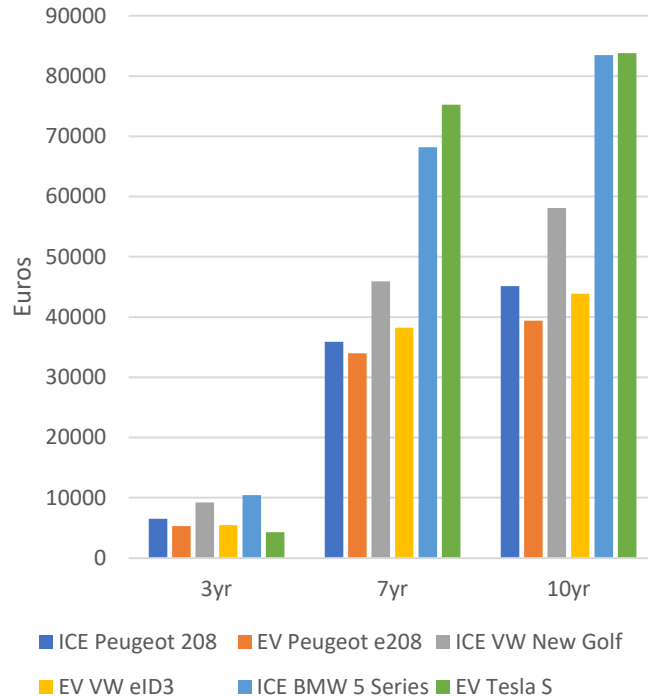
	3yr		7yr		10 yr	
	Low Mileage	High Mileage	Low Mileage	High Mileage	Low Mileage	High Mileage
Vehicle Costs	€ 1,412	€ 4,274	€ 44,270	€ 46,655	€ 48,425	€ 53,433
Fuel Costs	€ 6,651	€ 14,512	€ 15,519	€ 33,860	€ 22,171	€ 48,372
Maintenance Costs	€ 2,400	€ 3,120	€ 8,400	€ 10,920	€ 12,900	€ 16,770
Total Cost	€ 10,463	€ 21,906	€ 68,189	€ 91,435	€ 83,495	€ 118,575

EV – Tesla Model S

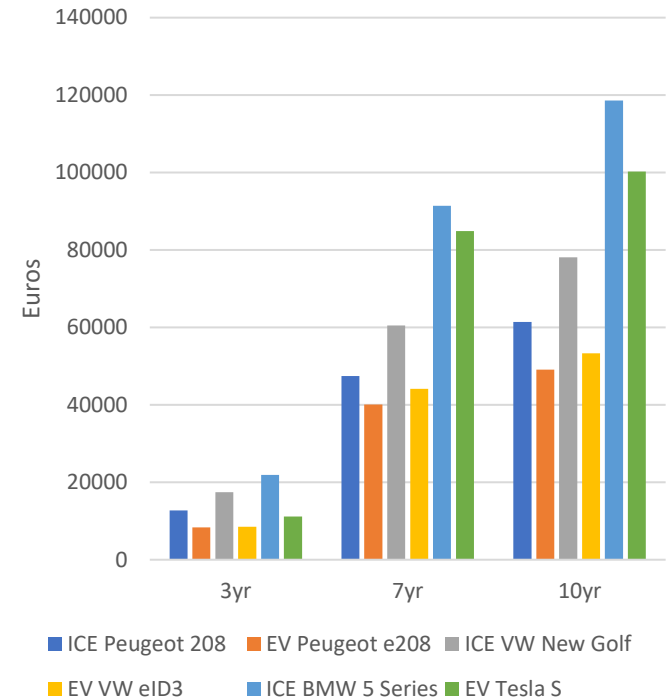
	3yr		7yr		10 yr	
	Low Mileage	High Mileage	Low Mileage	High Mileage	Low Mileage	High Mileage
Vehicle Costs	€ 705	€ 5,264	€ 66,515	€ 70,314	€ 71,154	€ 79,133
Fuel Costs	€ 2,351	€ 4,302	€ 4,552	€ 9,105	€ 6,203	€ 12,707
Maintenance Costs	€ 1,200	€ 1,560	€ 4,200	€ 5,460	€ 6,450	€ 8,385
Total Cost	€ 4,256	€ 11,127	€ 75,267	€ 84,879	€ 83,807	€ 100,225

FRANCE – TOTAL COST OF OWNERSHIP

France Total Cost of Ownership
Low Mileage



France Total Cost of Ownership
High Mileage





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SMALL CAR PURCHASE - GERMANY

Peugeot - 208

	3yr		7yr		10 yr	
	Low Mileage	High Mileage	Low Mileage	High Mileage	Low Mileage	High Mileage
Vehicle Costs	€ 1,013	€ 3,250	€ 20,236	€ 21,354	€ 21,864	€ 22,982
Fuel Costs	€ 3,232	€ 7,053	€ 7,542	€ 16,456	€ 10,775	€ 23,509
Maintenance Costs	€ 2,400	€ 3,000	€ 8,400	€ 10,920	€ 12,900	€ 16,770
Total Cost	€ 6,646	€ 13,303	€ 36,178	€ 48,730	€ 45,539	€ 63,261

Peugeot - e208

	3yr		7yr		10 yr	
	Low Mileage	High Mileage	Low Mileage	High Mileage	Low Mileage	High Mileage
Vehicle Costs	€ 1,662	€ 2,857	€ 26,674	€ 27,868	€ 28,287	€ 30,825
Fuel Costs	€ 2,875	€ 5,564	€ 5,908	€ 12,182	€ 8,183	€ 17,145
Maintenance Costs	€ 1,200	€ 1,560	€ 4,200	€ 5,460	€ 6,450	€ 8,385
Total Cost	€ 5,737	€ 9,980	€ 36,782	€ 45,510	€ 42,920	€ 56,355

MID-SIZE CAR PURCHASE - GERMANY

VW New Golf

	3yr		7yr		10 yr	
	Low Mileage	High Mileage	Low Mileage	High Mileage	Low Mileage	High Mileage
Vehicle Costs	€ 2,765	€ 5,709	€ 28,013	€ 29,485	€ 31,587	€ 32,471
Fuel Costs	€ 3,232	€ 7,053	€ 7,542	€ 16,456	€ 10,775	€ 23,509
Maintenance Costs	€ 2,400	€ 3,120	€ 8,400	€ 10,920	€ 12,900	€ 16,770
Total Cost	€ 8,397	€ 15,882	€ 43,955	€ 56,861	€ 55,262	€ 72,750

VW – eID3

	3yr		7yr		10 yr	
	Low Mileage	High Mileage	Low Mileage	High Mileage	Low Mileage	High Mileage
Vehicle Costs	€ 1,898	€ 3,298	€ 31,183	€ 32,582	€ 33,052	€ 36,026
Fuel Costs	€ 2,611	€ 4,987	€ 5,292	€ 10,836	€ 7,302	€ 15,223
Maintenance Costs	€ 1,200	€ 1,560	€ 4,200	€ 5,460	€ 6,450	€ 8,385
Total Cost	€ 5,709	€ 9,845	€ 40,674	€ 48,878	€ 46,804	€ 59,634



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LUXURY CAR PURCHASE - GERMANY

ICE – BMW 5 Series

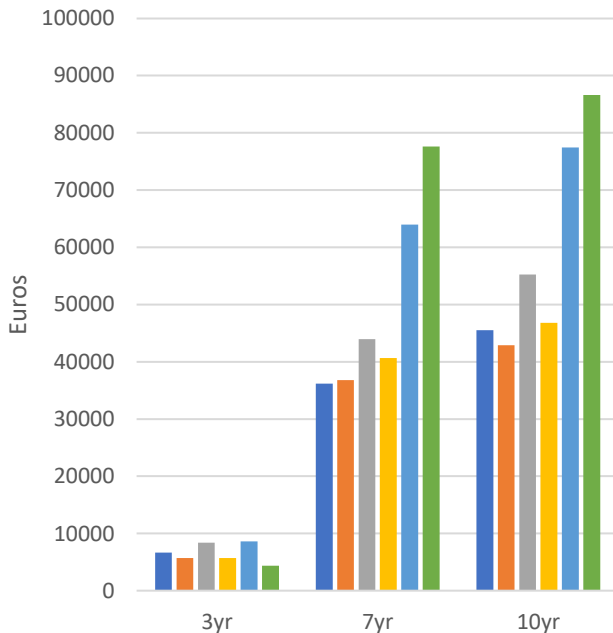
	3yr		7yr		10 yr	
	Low Mileage	High Mileage	Low Mileage	High Mileage	Low Mileage	High Mileage
Vehicle Costs	€ 689	€ 3,551	€ 42,583	€ 44,968	€ 46,015	€ 51,023
Fuel Costs	€ 5,558	€ 12,126	€ 12,968	€ 28,293	€ 18,525	€ 40,419
Maintenance Costs	€ 2,400	€ 3,120	€ 8,400	€ 10,920	€ 12,900	€ 16,770
Total Cost	€ 8,647	€ 18,797	€ 63,950	€ 84,181	€ 77,440	€ 108,212

EV – Tesla Model S

	3yr		7yr		10 yr	
	Low Mileage	High Mileage	Low Mileage	High Mileage	Low Mileage	High Mileage
Vehicle Costs	-€ 175	€ 4,504	€ 66,315	€ 70,214	€ 70,334	€ 78,523
Fuel Costs	€ 3,373	€ 6,651	€ 7,071	€ 14,719	€ 9,844	€ 20,770
Maintenance Costs	€ 1,200	€ 1,560	€ 4,200	€ 5,460	€ 6,450	€ 8,385
Total Cost	€ 4,398	€ 12,715	€ 77,586	€ 90,393	€ 86,629	€ 107,678

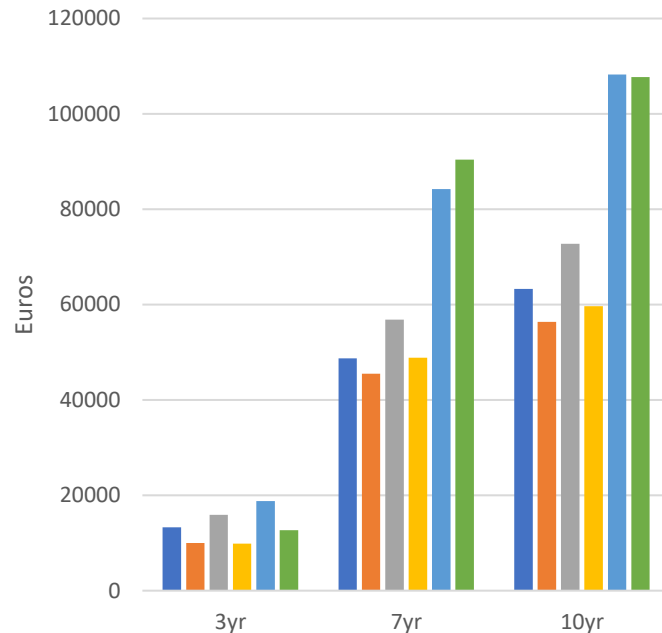
GERMANY – TOTAL COST OF OWNERSHIP

Germany Total Cost of Ownership
Low Mileage



■ ICE Peugeot 208 ■ EV Peugeot e208 ■ ICE VW New Golf
■ EV VW eID3 ■ ICE BMW 5 Series ■ EV Tesla S

Germany Total Cost of Ownership
High Mileage



■ ICE Peugeot 208 ■ EV Peugeot e208 ■ ICE VW New Golf
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SMALL CAR PURCHASE - UK

Peugeot - 208

	3yr		7yr		10 yr	
	Low Mileage	High Mileage	Low Mileage	High Mileage	Low Mileage	High Mileage
Vehicle Costs	€ 1,193	€ 3,430	€ 20,656	€ 21,774	€ 22,464	€ 23,582
Fuel Costs	€ 3,000	€ 6,545	€ 7,000	€ 15,272	€ 9,999	€ 21,817
Maintenance Costs	€ 2,400	€ 3,000	€ 8,400	€ 10,920	€ 12,900	€ 16,770
Total Cost	€ 6,593	€ 12,975	€ 36,055	€ 47,966	€ 45,364	€ 62,169

Peugeot - e208

	3yr		7yr		10 yr	
	Low Mileage	High Mileage	Low Mileage	High Mileage	Low Mileage	High Mileage
Vehicle Costs	€ 1,718	€ 2,918	€ 26,929	€ 28,130	€ 28,610	€ 31,161
Fuel Costs	€ 2,158	€ 4,118	€ 4,370	€ 8,943	€ 6,028	€ 12,561
Maintenance Costs	€ 1,200	€ 1,560	€ 4,200	€ 5,460	€ 6,450	€ 8,385
Total Cost	€ 5,076	€ 8,596	€ 35,499	€ 42,533	€ 41,088	€ 52,107

MID-SIZE CAR PURCHASE - UK

VW New Golf

	3yr		7yr		10 yr	
	Low Mileage	High Mileage	Low Mileage	High Mileage	Low Mileage	High Mileage
Vehicle Costs	€ 3,065	€ 6,009	€ 28,713	€ 30,185	€ 32,587	€ 33,471
Fuel Costs	€ 4,041	€ 8,816	€ 9,428	€ 20,570	€ 13,469	€ 29,386
Maintenance Costs	€ 2,400	€ 3,120	€ 8,400	€ 10,920	€ 12,900	€ 16,770
Total Cost	€ 9,505	€ 17,945	€ 46,541	€ 61,675	€ 58,956	€ 79,627

VW – eID3

	3yr		7yr		10 yr	
	Low Mileage	High Mileage	Low Mileage	High Mileage	Low Mileage	High Mileage
Vehicle Costs	€ 1,954	€ 3,359	€ 31,438	€ 32,844	€ 33,375	€ 36,362
Fuel Costs	€ 1,966	€ 3,698	€ 3,920	€ 7,962	€ 5,386	€ 11,160
Maintenance Costs	€ 1,200	€ 1,560	€ 4,200	€ 5,460	€ 6,450	€ 8,385
Total Cost	€ 5,119	€ 8,617	€ 39,558	€ 46,266	€ 45,211	€ 55,907



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LUXURY CAR PURCHASE - UK

ICE – BMW 5 Series

	3yr		7yr		10 yr	
	Low Mileage	High Mileage	Low Mileage	High Mileage	Low Mileage	High Mileage
Vehicle Costs	€ 1,622	€ 4,484	€ 44,760	€ 47,145	€ 49,125	€ 54,133
Fuel Costs	€ 6,752	€ 14,731	€ 15,754	€ 34,371	€ 22,505	€ 49,102
Maintenance Costs	€ 2,400	€ 3,120	€ 8,400	€ 10,920	€ 12,900	€ 16,770
Total Cost	€ 10,774	€ 22,335	€ 68,913	€ 92,436	€ 84,530	€ 120,005

EV – Tesla Model S

	3yr		7yr		10 yr	
	Low Mileage	High Mileage	Low Mileage	High Mileage	Low Mileage	High Mileage
Vehicle Costs	-€ 435	€ 4,484	€ 69,415	€ 73,514	€ 73,694	€ 82,303
Fuel Costs	€ 2,522	€ 4,911	€ 5,217	€ 10,792	€ 7,239	€ 15,203
Maintenance Costs	€ 1,200	€ 1,560	€ 4,200	€ 5,460	€ 6,450	€ 8,385
Total Cost	€ 3,287	€ 10,956	€ 78,832	€ 89,767	€ 87,383	€ 105,891



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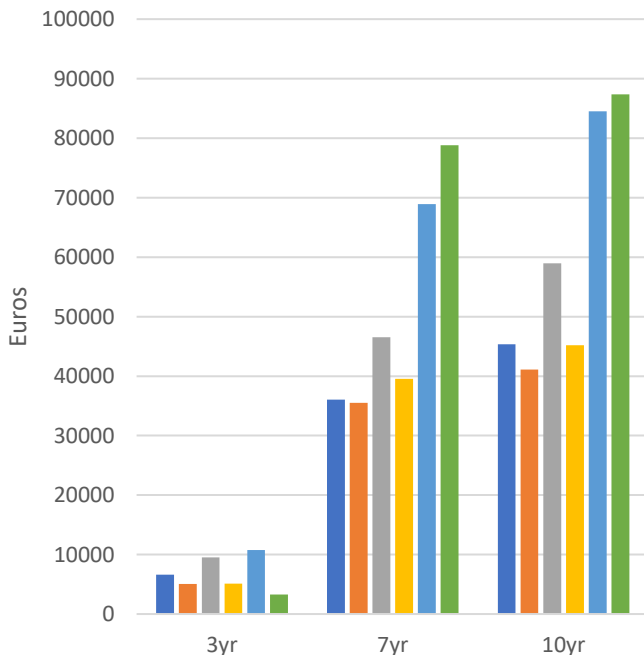
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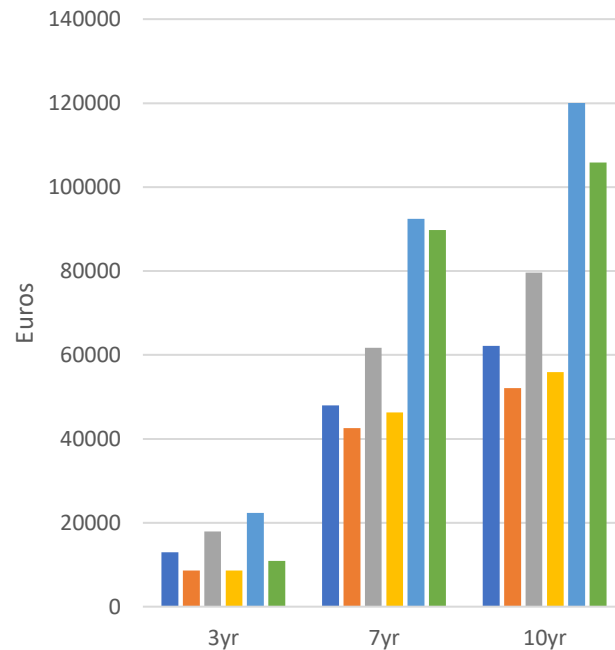
UK – TOTAL COST OF OWNERSHIP

UK Total Cost of Ownership Low Mileage



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 ■ EV Peugeot e208
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 ■ ICE BMW 5 Series
 ■ EV Tesla S

UK Total Cost of Ownership High Mileage



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