

Car Technologies in STEM Model (SCCER Mobility)

Technology Type	Fuel Type	Power Category	Annual usage (km)	Investment Cost per Car (2010\$)			Efficiency (vkm/MJ)		
				2012	2030	2050	2012	2030	2050
ICE	Gasoline	upto 60kW	9400	9'738	9'990	10'221	0.51	0.65	0.78
ICE	Diesel			9'953	10'265	10'535	0.58	0.72	0.84
ICE	Natural Gas			11'536	11'772	11'565	0.52	0.66	0.79
Hybrid	Gasoline			12'608	11'484	11'082	0.64	0.85	1.03
Hybrid	Diesel			12'795	11'713	11'333	0.72	0.91	1.08
Hybrid	Natural Gas			14'247	13'052	12'239	0.65	0.84	1.02
BEV	Electricity			34'086	19'478	17'691	1.55	1.84	2.14
Fuel Cell	Hydrogen			49'621	23'482	14'422	0.88	1.06	1.26
Plug-in Hybrid	Electricity & Gasoline			24'530	15'851	14'472	0.90	1.20	1.50
Plug-in Hybrid	Electricity & Diesel			24'733	16'090	14'744	0.96	1.25	1.54
Plug-in Hybrid	Electricity & Natural Gas	26'463	17'351	15'590	0.89	1.19	1.49		
ICE	Gasoline	from 60,01 to 100 kW	12000	16'560	16'759	16'962	0.41	0.53	0.64
ICE	Diesel			16'817	17'078	17'322	0.47	0.59	0.70
ICE	Natural Gas			18'649	18'845	18'523	0.42	0.54	0.65
Hybrid	Gasoline			21'125	19'189	18'432	0.53	0.71	0.87
Hybrid	Diesel			21'366	19'468	18'729	0.59	0.76	0.91
Hybrid	Natural Gas			23'021	21'009	19'757	0.54	0.70	0.86
BEV	Electricity			45'142	28'248	26'118	1.28	1.53	1.80
Fuel Cell	Hydrogen			76'766	34'945	23'192	0.72	0.88	1.06
Plug-in Hybrid	Electricity & Gasoline			33'771	23'915	22'225	0.75	1.00	1.27
Plug-in Hybrid	Electricity & Diesel			34'009	24'185	22'529	0.80	1.05	1.31
Plug-in Hybrid	Electricity & Natural Gas	35'997	25'622	23'483	0.74	1.00	1.26		
ICE	Gasoline	from 100,01 to 140 kW	13000	22'285	22'433	22'612	0.36	0.46	0.56
ICE	Diesel			22'573	22'786	23'008	0.41	0.52	0.62
ICE	Natural Gas			24'612	24'769	24'349	0.36	0.47	0.57
Hybrid	Gasoline			28'279	25'637	24'578	0.46	0.62	0.76
Hybrid	Diesel			28'572	25'959	24'914	0.51	0.66	0.80
Hybrid	Natural Gas			30'412	27'685	26'052	0.46	0.61	0.75
BEV	Electricity			54'797	35'742	33'285	1.10	1.33	1.57
Fuel Cell	Hydrogen			100'360	44'607	30'525	0.61	0.76	0.93
Plug-in Hybrid	Electricity & Gasoline			41'641	30'727	28'767	0.65	0.88	1.12
Plug-in Hybrid	Electricity & Diesel			41'912	31'026	29'100	0.69	0.92	1.15
Plug-in Hybrid	Electricity & Natural Gas	44'152	32'628	30'154	0.64	0.87	1.11		
ICE	Gasoline	more than 140 kW	12700	40'113	40'044	40'132	0.28	0.36	0.43
ICE	Diesel			40'560	40'544	40'673	0.33	0.42	0.50
ICE	Natural Gas			42'994	42'963	42'283	0.29	0.37	0.45
Hybrid	Gasoline			52'630	46'621	44'202	0.36	0.49	0.62
Hybrid	Diesel			53'264	47'172	44'721	0.40	0.53	0.65
Hybrid	Natural Gas			55'492	49'305	46'070	0.36	0.48	0.61
BEV	Electricity			81'429	57'234	53'728	0.88	1.08	1.29
Fuel Cell	Hydrogen			207'570	79'702	54'912	0.45	0.59	0.75
Plug-in Hybrid	Electricity & Gasoline			65'796	51'612	48'645	0.52	0.72	0.92
Plug-in Hybrid	Electricity & Diesel			66'190	52'006	49'068	0.55	0.75	0.95
Plug-in Hybrid	Electricity & Natural Gas	68'970	53'928	50'303	0.51	0.71	0.91		

Abbreviations: STEM: Swiss TIMES Energy system Model
ICE: Internal Combustion Engine
BEV: Battery Electric Vehicle

The data presented above is based on the dissertation of Johannes Hofer from 2014, which he conducted at the Paul Scherrer Institute/ETH Zürich (Title: "Sustainability Assessment of Passenger Vehicles: Analysis of Past Trends and Future Impacts of Electric Powertrains").

SCCER Mobility Capacity Area B2: Integrated Assessment of Mobility Systems
Research Topic B 2.3: Energy Economic Modelling
Task B2.3.1: Car Technology data base

Contact: Rashid A. Waraich or Brian Cox (Paul Scherrer Institute, Switzerland)
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