Comparison of electric charging and hydrogen infrastructure costs

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Outline

- Electrical outlet costs per BEV
- Hydrogen fueling infrastructure cost per FCEV

Hydrogen Infrastructure Cost

Station Type	kg/day	FCEVs supported	Installed Cost($M)	Cost per FCEV & total cost for 1 M FCEVs ($M)	Average $/FCEV
Mobile refueler	10	21	0.243	$ 11,571	
SMR	100	211	1.048	$ 4,967	
SMR	113	238	1.078	$ 4,529	
SMR	480	1,014	2.740	$ 2,702	
SMR	565	1,193	3.088	$ 2,588	$ 3,201 – $ 4,038
SMR	1000	2,112	5.137	$ 2,432	
LH2 station	1000	2,112	2.697	$ 1,277	
HTFC energy station	91	192	1.345	$ 7,005	
DOE-H2A-SMR	1500	3,169	4.71	$ 1,486	
Current-NRC/NAS-SMR	480	1,014	1.848	$ 1,822	
Future-UC-Davis SMR	480	1,014	1.458	$ 1,438	$ 1,191
Future-NRC/NAS	480	1,014	0.957	$ 944	

BEVs outlet cost, charging times.XLS; WS 'H2 cost per car' N 22 5/2 /2011

Hydrogen infrastructure cost per vehicle

- Average cost initially: $3,200/FCEV
- Future cost estimate: $1,200/FCEV

Electrical Infrastructure Costs

Type II (240V) charging required

			Charging time (hours)		
	Nominal AER range (miles)	EPA rated range (miles)	Type I 120 Volt	Type II 240 Volt	Type III 480+ volt
Nissan Leaf BEV	100	73	16	8	80% in 1/2 hr
Chevy Volt PHEV	40	?	10	4	
Ford Focus BEV	≈100	?	18 to 20	3 to 4	??
Mitsubishi MiEV	83		22.5	6	80% in 1/2 hr
Toyota RAV4 BEV prototype*	100	?	28	12	

*Toyota assures reporters that the production RAV4 will have shorter charging times

BEVs outlet cost, charging times; WS -charging times- F 10 8/5 /2011

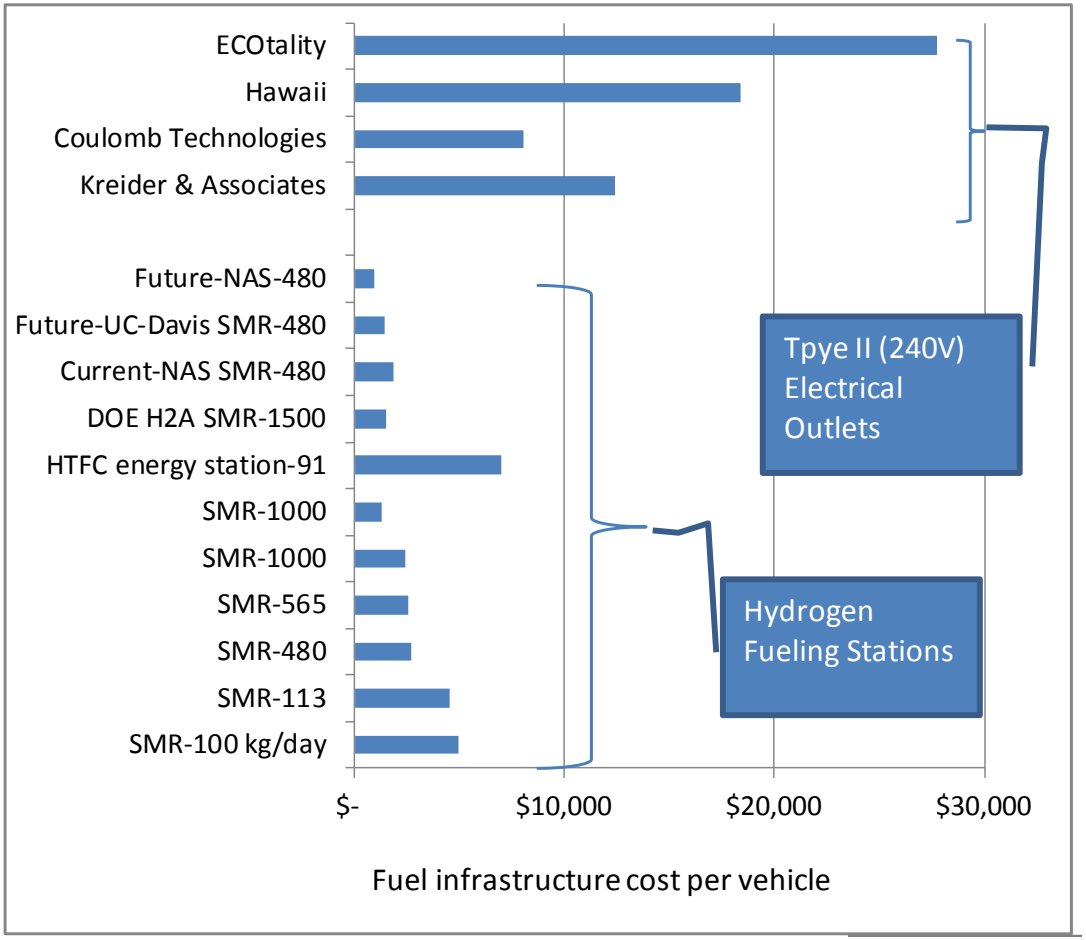
Electrical Fueling Costs (Type II 240-Volt outlets)

(Electrification Coalition recommends two public outlets per BEV)

	Total Cost ($M)	# of BEVs		Cost per BEV/PHEV
Kreider & Associates	3.72	300		$ 12,400
Coulomb Technologies	37	4500		$ 8,222
Hawaii	4.6	250		$ 18,400
ECOtality	230	8300		$ 27,711
Totals	275.32	13350		$ 20,623

BEVs outlet cost, charging times.XLS; WS 'Outlet costs' J 31 7/7 /2011

Fuel infrastructure cost per vehicle



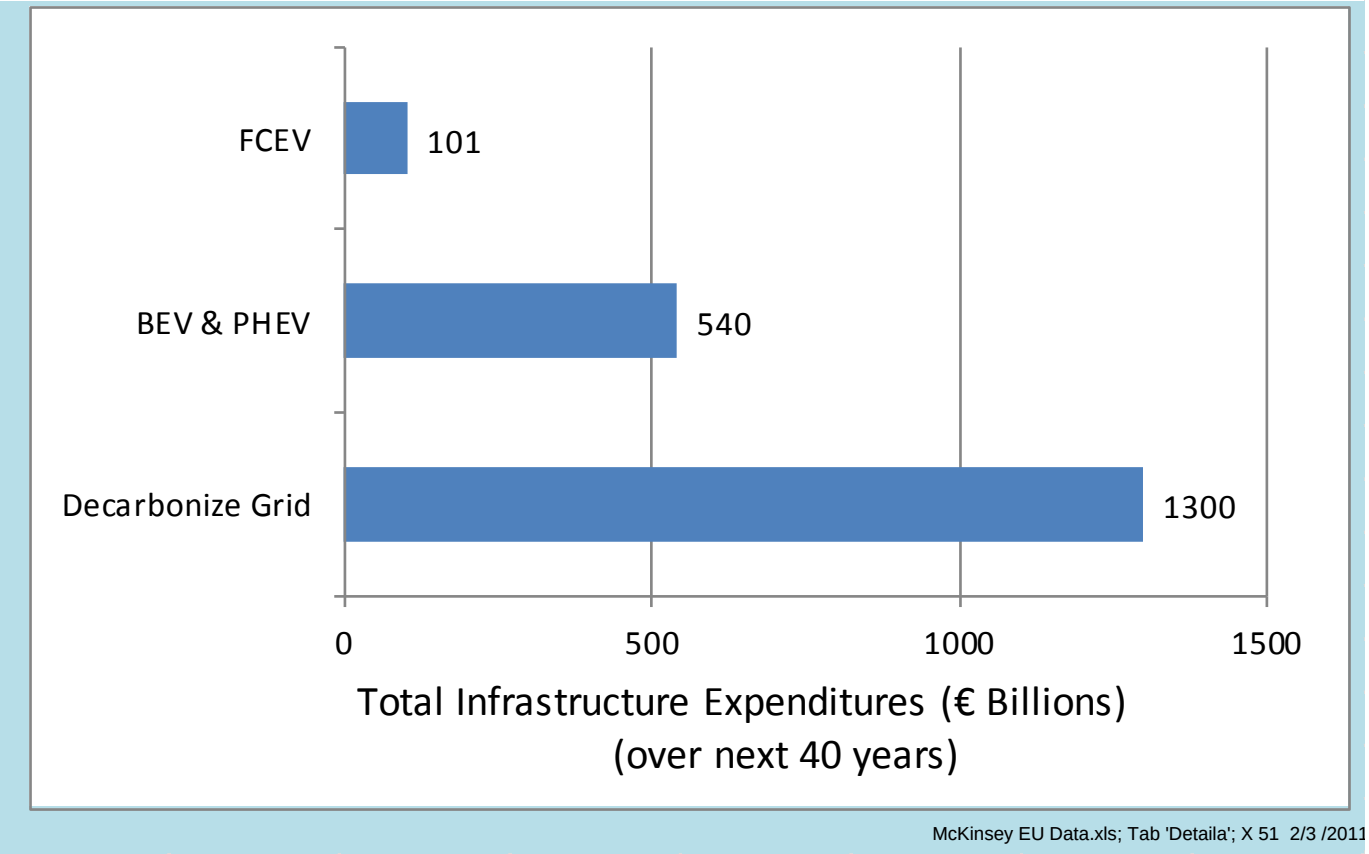
BEVs outlet cost, charging times.XLS; WS 'H2 Cost per car' I 53 10/12 /201

Type II Electrical outlets cost between 5.2 to 14 times more than hydrogen stations per vehicle

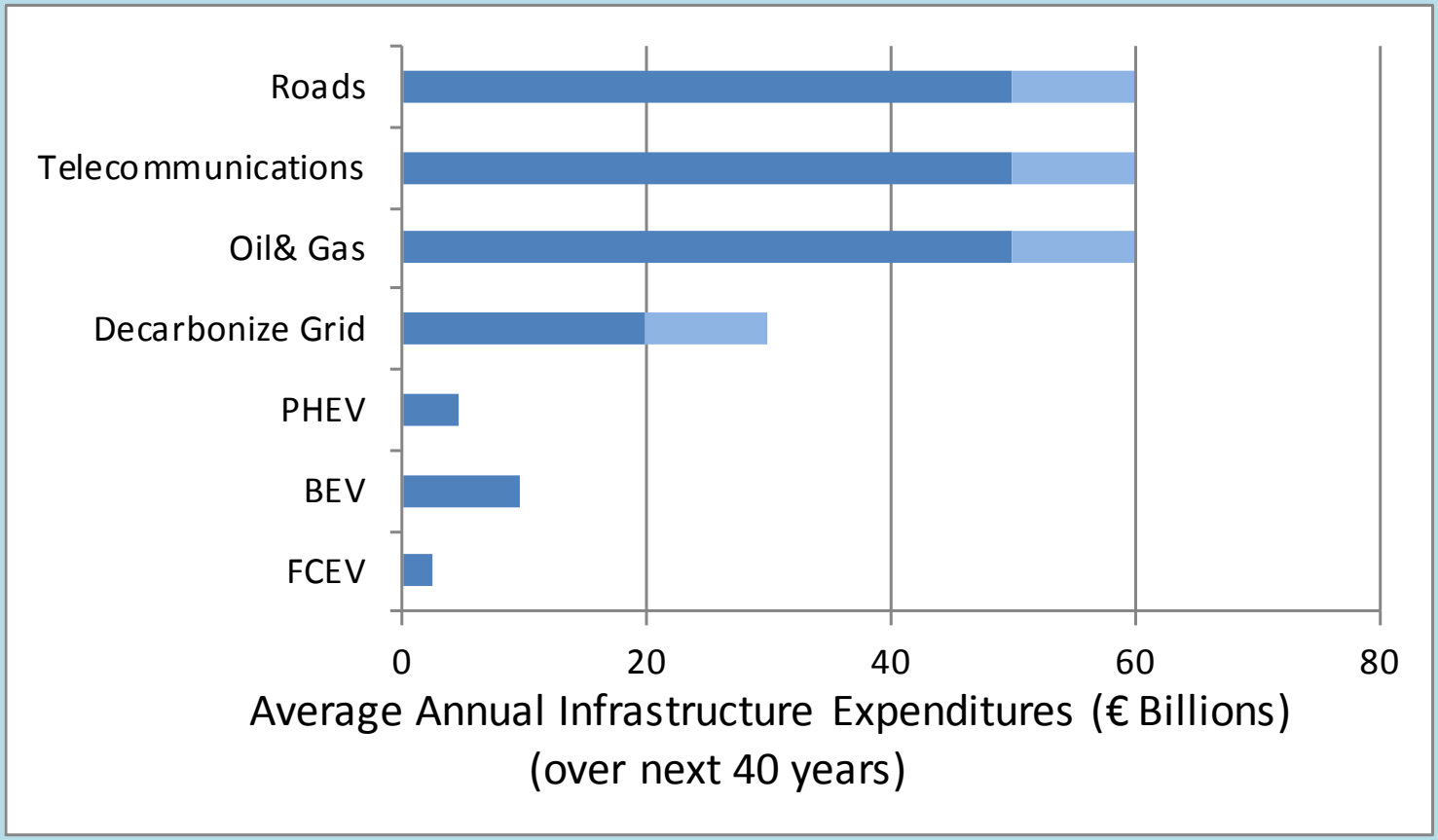
McKinsey & Company 2007 EU Report

available at:
http://www.europeanclimate.org/documents/Power_trains_for_Europe.pdf

Total Cumulative Infrastructure Costs over 40 years **(McKinsey)**



Average Annual EU Infrastructure
Costs over next 40 years (McKinsey)



McKinsey EU Data.xls; Tab 'Detaila'; X 34 2/3 /2011

Thank You

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