

Appendix D: Results

A: Electricity generation – onsite electrolysis - transport 160 km

Compressed storage and transport

	Time	Cost (p/km driven)		Capital cost (£/car)	Cost (£/GJ)	
		Low	High		Low	High
Offshore wind	2002	4.41	4.67	3,520	36.8	38.9
	2020	2.31	2.76	1,580	19.3	23.0
Onshore wind (60 MW)	2002	3.29	4.39	3,300	27.4	36.6
	2020	2.09	2.53	1,500	17.4	21.1
Onshore wind (10 MW)	2002	3.46	4.56	3,530	28.8	38.0
	2020	2.22	2.67	1,680	18.5	22.2
Wave	2002	-	-	-		
	2020	2.83	3.27	4,070	23.5	27.3
Tidal	2002	4.14	9.36	6,710	34.5	78.0
	2020	2.85	4.63	3,290	23.8	38.6
Small hydro	2002	3.61	3.87	4,160	30.1	32.3
	2020	2.18	4.41	2,040	18.2	36.7

Non renewable energy use: 0.254 MJ/km

CO2 emissions: 16.7 g/km

Compressed and liquid storage, and liquid transport

	Time	Cost (p/km driven)		Capital cost (£/car)	Cost (£/GJ)	
		Low	High		Low	High
Offshore wind	2002	4.63	4.93	4,560	38.6	41.1
	2020	2.12	2.61	2,150	17.6	21.8
Onshore wind (60 MW)	2002	3.35	4.62	4,330	27.9	38.5
	2020	1.87	2.36	2,070	15.6	19.7
Onshore wind (10 MW)	2002	3.97	5.23	5,220	33.1	43.6
	2020	2.31	2.81	2,700	19.3	23.4
Wave	2002	-	-	-		
	2020	2.79	3.28	5,060	23.2	27.3
Tidal	2002	4.55	10.58	8,600	37.9	88.2
	2020	2.95	4.92	4,390	24.5	41.0
Small hydro	2002	4.28	4.59	6,150	35.7	38.2
	2020	2.42	4.89	3,330	20.2	40.8

Non renewable energy use: 0.011 MJ/km

CO2 emissions: 0.7 g/km

Pipeline storage and transport

	Time	Cost (p/km driven)		Capital cost (£/car)	Cost (£/GJ)	
		Low	High		Low	High
Offshore wind	2002	3.71	3.96	4,280	30.9	33.0
	2020	1.67	2.09	2,180	13.9	17.4
Onshore wind (60 MW)	2002	2.73	3.78	4,310	22.7	31.5
	2020	1.46	1.88	2,100	12.1	15.7
Onshore wind (10 MW)	2002	4.27	5.32	9,070	35.6	44.3
	2020	2.56	2.98	5,210	21.3	24.8
Wave	2002	-	-	-		
	2020	2.43	2.86	5,410	20.3	23.8
Tidal	2002	4.45	9.46	10,090	37.1	78.8
	2020	3.09	4.78	6,260	25.8	39.9
Small hydro	2002	4.98	5.23	11,130	41.5	43.6
	2020	3.30	5.41	7,790	27.5	45.1

B: Electricity generation – grid – regional electrolysis - transport 32 km**Compressed storage and transport**

	Time	Cost (p/km driven)		Capital cost (£/car)	Cost (£/GJ)	
		Low	High		Low	High
Offshore wind	2002	3.22	3.78	3,010	26.9	31.5
	2020	1.37	2.07	1,200	11.4	17.2
Onshore wind (60 MW)	2002	1.86	3.35	2,520	15.5	27.9
	2020	1.15	1.84	1,120	9.6	15.4
Onshore wind (10 MW)	2002	1.86	3.35	2,520	15.5	27.9
	2020	1.15	1.84	1,120	9.6	15.4
Wave	2002	-	-	-		
	2020	1.81	2.51	3,800	15.1	21.0
Tidal	2002	2.59	8.31	6,130	21.6	69.3
	2020	1.71	3.94	2,930	14.2	32.8
Small hydro	2002	2.66	3.15	3,990	22.2	26.2
	2020	1.40	3.82	1,880	11.7	31.8

Non renewable energy use: 0.050 MJ/km

CO2 emissions: 3.3 g/km

Liquid storage and transport

	Time	Cost (p/km driven)		Capital cost (£/car)	Cost (£/GJ)	
		Low	High		Low	High
Offshore wind	2002	3.48	4.10	3,700	29.0	34.2
	2020	1.33	2.07	1,530	11.1	17.3
Onshore wind (60 MW)	2002	1.97	3.63	3,150	16.4	30.2
	2020	1.10	1.84	1,440	9.2	15.3
Onshore wind (10 MW)	2002	1.97	3.63	3,150	16.4	30.2
	2020	1.10	1.84	1,440	9.2	15.3
Wave	2002	-	-	-	0.0	0.0
	2020	1.79	2.55	4,290	15.0	21.3
Tidal	2002	2.77	9.15	7,170	23.1	76.2
	2020	1.68	4.07	3,370	14.0	33.9
Small hydro	2002	2.85	3.40	4,790	23.7	28.3
	2020	1.36	3.94	2,260	11.4	32.8

Non renewable energy use: 0.002 MJ/km

CO2 emissions: 0.1 g/km

Pipeline storage and transport

	Time	Cost (p/km driven)		Capital cost (£/car)	Cost (£/GJ)	
		Low	High		Low	High
Offshore wind	2002	2.67	3.20	3,020	22.2	26.7
	2020	0.90	1.56	1,190	7.5	13.0
Onshore wind (60 MW)	2002	1.36	2.79	2,530	11.4	23.3
	2020	0.69	1.35	1,100	5.7	11.3
Onshore wind (10 MW)	2002	1.36	2.79	2,550	11.4	23.3
	2020	0.69	1.35	1,120	5.7	11.3
Wave	2002	-	-	-		
	2020	1.31	1.99	3,790	10.9	16.6
Tidal	2002	2.05	7.55	6,150	17.1	62.9
	2020	1.21	3.35	2,930	10.1	27.9
Small hydro	2002	2.12	2.60	4,020	17.7	21.6
	2020	0.93	3.23	1,890	7.7	26.9

C: Electricity generation – grid – forecourt electrolysis**Compressed storage**

	Time	Cost (p/km driven)		Capital cost (£/car)	Cost (£/GJ)	
		Low	High		Low	High
Offshore wind	2002	3.00	3.56	3,140	25.0	29.6
	2020	1.06	1.76	1,230	8.9	14.7
Onshore wind (60 MW)	2002	1.64	3.13	2,660	13.7	26.1
	2020	0.84	1.54	1,150	7.0	12.8
Onshore wind (10 MW)	2002	1.64	3.13	2,660	13.7	26.1
	2020	0.84	1.54	1,150	7.0	12.8
Wave	2002	-	-	-		
	2020	1.50	2.21	3,830	12.5	18.4
Tidal	2002	2.37	8.09	6,270	19.8	67.4
	2020	1.40	3.63	2,960	11.7	30.3
Small hydro	2002	2.44	2.93	4,120	20.3	24.4
	2020	1.10	3.51	1,910	9.1	29.3

Liquid storage

	Time	Cost (p/km driven)		Capital cost (£/car)	Cost (£/GJ)	
		Low	High		Low	High
Offshore wind	2002	4.24	4.86	4,700	35.3	40.5
	2020	1.85	2.59	2,260	15.4	21.6
Onshore wind (60 MW)	2002	2.73	4.39	4,150	22.8	36.6
	2020	1.61	2.35	2,170	13.4	19.6
Onshore wind (10 MW)	2002	2.73	4.39	4,150	22.8	36.6
	2020	1.61	2.35	2,170	13.4	19.6
Wave	2002	-	-	-		
	2020	2.31	3.07	5,020	19.2	25.6
Tidal	2002	3.53	9.91	8,170	29.4	82.6
	2020	2.19	4.58	4,100	18.3	38.2
Small hydro	2002	3.61	4.16	5,780	30.1	34.7
	2020	1.88	4.45	2,990	15.6	37.1

D: Forecourt generation – forecourt electrolysis**Compressed storage**

	Time	Cost (p/km driven)		Capital cost (£/car)	Cost (£/GJ)	
		Low	High		Low	High
Onsite wind	2002	3.23	4.32	4,270	26.9	36.0
	2020	1.61	2.05	1,910	13.4	17.1
Onsite PV	2002	-	42.15	30,790	-	351.3
	2020	8.51	11.18	8,220	70.9	93.2

Compressed and liquid storage

	Time	Cost (p/km driven)		Capital cost (£/car)	Cost (£/GJ)	
		Low	High		Low	High
Onsite wind	2002	4.99	6.26	6,620	41.6	52.2
	2020	2.81	3.30	3,490	23.4	27.5
Onsite PV	2002	-	53.05	40,900	-	442.1
	2020	12.87	15.83	13,640	107.2	131.9

E: Biomass production – biomass transport - gasification - transport 32 km**Compressed storage and transport**

	Time	Cost (p/km driven)		Capital cost (£/car)	Cost (£/GJ)		Non-renewable energy use (MJ/km)	CO2 emissions (g/km)
		Low	High		Low	High		
SRC	2002	1.05	1.05	810	8.76	8.76	0.174	19.3
	2020	0.97	0.97	640	8.09	8.09	0.158	16.7
Forestry wastes	2002	1.06	1.06	1,390	8.88	8.88	0.215	11.0
	2020	0.98	0.98	1,020	8.20	8.20	0.193	9.6

Liquid storage and transport

	Time	Cost (p/km driven)		Capital cost (£/car)	Cost (£/GJ)		Non-renewable energy use (MJ/km)	CO2 emissions (g/km)
		Low	High		Low	High		
SRC	2002	1.21	1.21	1,520	10.08	10.08	0.163	21.0
	2020	1.01	1.01	1,100	8.46	8.46	0.125	15.5
Forestry wastes	2002	1.22	1.22	2,270	10.19	10.19	0.217	10.2
	2020	1.03	1.03	1,540	8.57	8.57	0.166	7.3

Pipeline storage and transport

	Time	Cost (p/km driven)		Capital cost (£/car)	Cost (£/GJ)		Non-renewable energy use (MJ/km)	CO2 emissions (g/km)
		Low	High		Low	High		
SRC	2002	0.58	0.58	810	4.87	4.87	0.123	16.0
	2020	0.53	0.53	610	4.40	4.40	0.107	13.4
Forestry wastes	2002	0.60	0.60	1,380	4.98	4.98	0.164	7.7
	2020	0.54	0.54	1,000	4.52	4.52	0.143	6.2