

Table 2. Top ten hybrid car patents (all applicants) according to NPA analysis

NPA patent ranking	Patent number	Priority year	Summary of patented invention	Owner	# of forward citations	Ranking according to forward citation count alone	# of reverse citations
1	US 6,209,672	1998	Hybrid car with two electric motors, one connected to engine and one connected to car wheels	Paice Corporation	114	10	174
2	US 5,343,970	1992	Improved hybrid electric vehicle where both engine and electric motor power the car, and energy is capture via regenerative braking	Paice Corporation	256	1	37
3	US 5,806,617	1995	Control system for combining electric and motor power in transmission	Equos Research	103	14	18
4	US 6,338,391	1999	Electric motor coupled to turbocharged motor, and control system	Paice Corporation	30	280	185
5	US 4,351,405	1978	Engine driving one set of wheels, and electric motor partially powered by regenerative braking driving the other set of wheels	Hybricon Incorporated	142	4	15
6	US 5,428,274	1991	Control system for electric motor powered by internal combustion motor or battery	Toyota	33	238	23
7	US 6,554,088	2001	Hybrid only runs engine when high torque needed	Paice Corporation	49	115	216
8 =	US 5,264,764	1992	Controller for requesting an engine driven generator to top up the vehicle batter	Ford	70	51	18
8 ^d =	US 6,470,983	1999	Controls battery level on hybrid drive according to navigation plans of drive	Hitachi	40	171	47
10.	US 6,943,460	2002	Control system for a hybrid car including cylinder deactivation	Honda	4	3374	21

Table 3. Top five Paice hybrid car patents according to NPA analysis

NPA patent ranking- (Paice ranking)	Patent number	Publication year	Summary of patented invention	# of forward citations ⁵	# of reverse citations
1 (P1)	US 6,209,672	2001	Hybrid car with two electric motors, one connected to engine and one connected to car wheels	114	174
2 (P2)	US 5,343,970	1994	Improved hybrid electric vehicle where both engine and electric motor power the car, and energy is capture via regenerative braking	256	37
4 (P3)	US 6,338,391	2002	Electric motor coupled to turbocharged motor, and control system	30	185
7 (P4)	US 6,554 088	2003	Hybrid only runs engine when high torque needed	49	216
174 (P5)	US 20030217876	2003	Control of a hybrid vehicle so that the engine is only run under conditions of high efficiency	11	440