

Table SINV-6

International patent families granted in electrical machinery, apparatus, energy, by region, country, or economy: 1998–2020

(Number)

Region, country, or economy	Economy by income status	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World	na	18,452	21,326	19,498	19,992	20,920	22,169	22,445	21,540	26,850	29,080	27,486	28,557	32,669	38,880	44,985	48,973	51,136	50,674	60,253	64,764	62,809	63,484	65,320
North America	na	3,330	3,527	3,606	3,676	3,515	3,580	3,723	2,850	3,427	3,146	3,040	3,258	3,717	3,563	3,707	4,027	4,260	4,551	4,957	5,176	4,751	5,214	4,634
Canada	High	131	131	144	142	137	163	178	145	165	177	149	180	197	177	189	215	223	220	216	259	220	244	205
Mexico	Upper middle	2	4	3	6	5	9	8	6	5	5	8	7	9	8	12	12	12	13	45	37	29	29	23
United States	High	3,197	3,393	3,460	3,528	3,374	3,408	3,538	2,699	3,257	2,964	2,883	3,071	3,512	3,378	3,506	3,800	4,025	4,319	4,696	4,879	4,501	4,941	4,407
Central America and Caribbean	na	0	2	3	2	1	0	0	0	0	0	1	1	5	1	2	1	2	3	3	2	2	2	2
Puerto Rico	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South America	na	7	9	17	14	20	10	18	9	17	11	18	17	22	36	24	28	26	43	38	58	53	53	69
Argentina	Upper middle	3	3	5	3	1	1	1	0	0	3	0	1	4	1	2	2	1	2	2	4	3	3	4
Brazil	Upper middle	3	5	11	11	17	9	16	9	17	7	16	13	17	35	22	23	21	34	31	47	45	44	61
Europe	na	4,028	4,046	4,120	3,859	4,015	4,400	4,677	4,020	4,197	3,961	4,289	4,291	4,529	4,368	4,948	4,995	5,618	5,756	6,374	6,918	6,850	7,092	6,596
EU-27 + UK ^a	na	3,215	3,386	3,433	3,310	3,367	3,495	3,581	3,070	3,293	3,020	3,118	3,184	3,408	3,523	3,957	4,018	4,546	4,617	5,373	5,922	5,710	6,017	5,612
United Kingdom	High	219	258	262	239	273	288	254	264	206	181	196	182	184	188	255	238	297	300	328	312	300	333	390
EU-27 ^b	na	2,996	3,128	3,170	3,071	3,094	3,207	3,327	2,806	3,086	2,840	2,922	3,002	3,224	3,335	3,702	3,780	4,249	4,317	5,045	5,610	5,410	5,684	5,222
Austria	High	70	61	80	60	86	103	94	74	127	91	120	102	107	131	150	152	177	213	213	260	265	252	273
Belgium	High	41	35	35	39	39	33	32	25	29	25	22	34	28	22	28	25	33	43	81	76	69	89	109
Denmark	High	14	11	21	26	24	34	27	31	26	23	36	40	56	50	50	66	76	57	67	67	65	76	55
Finland	High	44	42	50	50	66	58	71	69	62	46	63	55	65	70	62	63	62	77	96	120	86	86	95
France	High	688	645	629	688	585	635	623	463	646	575	580	610	570	589	735	817	888	896	947	962	1,061	1,108	1,046
Germany	High	1,330	1,318	1,375	1,461	1,554	1,614	1,617	1,462	1,659	1,524	1,530	1,517	1,606	1,619	1,872	1,863	2,082	2,205	2,524	2,610	2,544	2,827	2,646
Hungary	High	9	9	11	7	11	20	10	5	9	7	14	10	9	15	22	19	21	16	17	13	25	29	17
Ireland	High	17	17	14	7	8	16	12	9	17	7	11	10	16	12	16	22	17	18	17	22	21	19	20
Italy	High	266	375	409	218	211	164	372	203	59	70	83	70	140	200	152	93	103	104	140	516	421	382	254
Netherlands	High	146	154	169	153	166	164	129	113	126	113	116	131	132	164	163	180	187	182	248	246	247	225	212
Spain	High	86	97	55	82	65	86	75	89	82	105	88	112	120	144	134	146	190	125	160	180	141	121	104
Sweden	High	89	173	128	133	134	119	101	76	78	70	81	86	109	96	121	122	154	129	151	138	139	127	138
Other Europe	na	813	660	688	549	649	906	1,097	951	904	941	1,171	1,107	1,121	845	991	977	1,072	1,139	1,001	995	1,140	1,075	985
Other Europe-2020 ^b	na	1,032	918	950	789	921	1,193	1,350	1,215	1,111	1,122	1,367	1,288	1,305	1,033	1,246	1,215	1,369	1,439	1,328	1,307	1,440	1,408	1,375

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Belarus	Upper middle	0	2	3	2	2	3	3	3	4	5	7	8	6	1	7	3	7	6	4	4	2	7	2
Moldova	Lower middle	5	7	12	11	4	6	7	12	5	3	7	9	14	3	5	4	6	8	9	2	3	4	2
Norway	High	24	15	18	16	24	15	16	29	16	22	16	21	24	24	26	27	31	35	43	32	48	27	47
Russia	Upper middle	655	514	510	383	474	663	686	728	689	680	865	759	812	558	724	667	747	854	658	682	836	787	711
Switzerland	High	99	112	122	117	97	102	105	97	119	100	124	134	132	133	137	148	171	163	180	185	168	186	171
Ukraine	Lower middle	26	8	19	18	47	111	275	75	66	116	138	154	121	108	78	108	86	53	72	57	57	31	9
Asia	na	10,915	13,372	11,348	12,121	13,030	13,738	13,560	14,323	18,947	21,723	19,935	20,783	24,184	30,719	36,106	39,728	41,016	40,034	48,659	52,394	50,938	50,903	53,785
China	Upper middle	104	126	295	242	331	506	840	832	1,099	1,648	2,737	4,087	4,899	7,032	9,859	10,330	11,411	16,900	22,439	25,870	27,471	27,522	30,936
India	Lower middle	2	1	1	7	8	4	12	22	15	24	19	22	37	38	48	59	62	81	86	113	103	139	132
Japan	High	9,252	10,103	8,987	9,526	9,816	10,454	9,389	9,069	9,548	10,596	11,298	12,043	13,643	15,599	17,340	19,551	19,447	14,167	16,404	16,044	14,403	13,811	13,060
Malaysia	Upper middle	1	4	3	4	4	5	8	7	23	22	14	20	26	27	33	29	28	26	37	22	31	13	12
Singapore	High	5	9	16	17	22	21	17	20	19	24	26	23	30	26	31	28	42	49	54	67	62	46	43
South Korea	High	1,185	2,782	1,567	1,576	2,120	1,944	2,302	3,344	6,797	8,144	4,888	3,505	4,219	6,436	6,814	7,310	7,379	6,392	7,315	8,226	7,165	7,669	8,176
Taiwan	High	364	344	478	744	726	793	984	1,021	1,428	1,252	944	1,063	1,317	1,552	1,969	2,407	2,621	2,395	2,302	2,005	1,665	1,663	1,400
Middle East	na	10	19	33	39	33	49	30	33	33	32	33	33	36	31	48	50	54	74	83	101	97	86	109
Israel	High	9	16	21	28	29	37	29	26	28	26	28	30	32	29	36	39	41	53	60	72	66	59	70
Africa	na	56	64	49	54	56	51	48	38	30	28	43	49	63	29	34	32	37	15	15	17	14	22	15
South Africa	Upper middle	51	58	42	45	42	42	40	33	27	26	39	45	54	14	24	18	23	13	6	11	6	9	4
Australia and Oceania	na	77	120	117	204	226	337	357	199	172	161	125	118	103	129	102	107	121	192	107	98	102	112	108
Australia	High	69	113	110	197	216	327	348	189	166	155	111	105	93	113	90	92	102	173	80	75	86	91	88
New Zealand	High	7	7	7	7	10	11	9	10	6	6	14	13	10	16	12	15	19	19	26	22	16	21	19
Unclassified	na	30	167	204	22	24	4	32	68	26	19	2	6	10	4	14	5	2	6	19	1	1	1	2

na = not applicable, metric not calculated at this level.

EU = European Union; UK = United Kingdom.

^a The United Kingdom was a part of the EU for data purposes from 1973 to 2019.

^b Beginning in 2020, the United Kingdom was no longer a member of the EU.

Note(s):

International Patent Documentation (INPADOC) patent families across all patent offices covered in the Worldwide Patent Statistical Database (PATSTAT) are counted according to the year of the first granted patent in the patent family. Patent families are allocated according to patent inventorship information found on the priority patent of the INPADOC patent families. To account for missing ownership information in PATSTAT for some offices, a method designed by de Rassenfosse et al. (2013) is used to fill missing information on priority patents using information in successive filings within the families. Priority patents not indexed in PATSTAT are replaced by the next utility patent(s) in the families according to filing dates. Patent families are fractionally allocated among regions, countries, or economies based on the proportion of residences of all named inventors. Patents are classified under the World Intellectual Property Organization (WIPO) classification of patents, which classifies International Patent Classification (IPC) codes under 35 technical fields. IPC reformed codes take into account changes that were made to the WIPO classification in 2006 under the eighth version of the classification and were used to prepare these data. China includes Hong Kong. Data were extracted in June 2021. Because of data coverage issues for some patent offices in PATSTAT, statistics for some countries may be underestimated partially for some years or across the whole trend. Countries with identified issues include India (missing data) and South Africa (no data for 2018). For Italy, because of data gaps regarding information on granted patents, patent applications are used instead, which slightly overestimates Italy's output and creates a small shift in year for which its output is accounted. As patent authorities become more involved with the European Patent Organisation, these gaps should disappear in the future, strengthening the robustness of statistics for these countries.

Source(s):

National Center for Science and Engineering Statistics; Science-Metrix; PATSTAT, accessed October 2021.

Science and Engineering Indicators