



APPENDIX TABLE 6-58

USPTO patents granted in energy storage technologies, by region, country, or economy: 1998–2016

(Number)

| Region, country, or economy | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|
| World | 449 | 478 | 521 | 582 | 649 | 688 | 656 | 505 | 569 | 566 | 579 | 667 | 1,016 | 1,046 | 1,180 | 1,383 | 1,729 | 1,847 | 1,810 |
| North America | 204 | 213 | 214 | 244 | 222 | 281 | 263 | 207 | 236 | 222 | 246 | 245 | 366 | 357 | 401 | 451 | 548 | 510 | 516 |
| Canada | 11 | 16 | 18 | 11 | 11 | 17 | 16 | 12 | 15 | 15 | 17 | 15 | 19 | 21 | 24 | 24 | 23 | 25 | 26 |
| Mexico | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 0 |
| Puerto Rico | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| United States | 193 | 197 | 196 | 232 | 211 | 264 | 247 | 194 | 220 | 207 | 229 | 230 | 346 | 336 | 377 | 426 | 523 | 485 | 491 |
| Central and South America | 0 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 0 | 2 | 2 | 4 | 1 | 1 |
| Argentina | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| Brazil | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 |
| All others | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 1 |
| Europe | 48 | 48 | 54 | 59 | 73 | 62 | 75 | 51 | 42 | 45 | 59 | 53 | 88 | 104 | 95 | 119 | 177 | 177 | 157 |
| EU | 46 | 40 | 53 | 53 | 66 | 57 | 60 | 44 | 35 | 41 | 49 | 45 | 78 | 93 | 79 | 101 | 163 | 164 | 141 |
| Austria | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 3 | 3 | 2 |
| Belgium | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 2 | 3 | 1 |
| Denmark | 4 | 1 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 1 | 5 | 2 | 3 | 3 | 0 | 3 | 3 | 3 | 2 |
| Finland | 0 | 1 | 0 | 3 | 3 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 3 | 1 | 4 | 0 | 1 |



| Region, country, or economy | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|
| France | 7 | 9 | 15 | 12 | 18 | 10 | 9 | 6 | 5 | 7 | 9 | 16 | 21 | 33 | 24 | 26 | 46 | 50 | 38 |
| Germany | 15 | 13 | 23 | 15 | 18 | 23 | 28 | 14 | 12 | 20 | 12 | 14 | 31 | 26 | 25 | 36 | 46 | 54 | 49 |
| Hungary | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Ireland | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Italy | 5 | 2 | 2 | 1 | 4 | 1 | 4 | 5 | 4 | 0 | 4 | 3 | 4 | 4 | 6 | 5 | 6 | 9 | 8 |
| Netherlands | 5 | 1 | 1 | 3 | 5 | 4 | 4 | 4 | 1 | 1 | 5 | 3 | 3 | 4 | 3 | 7 | 12 | 4 | 5 |
| Spain | 1 | 1 | 1 | 2 | 1 | 1 | 3 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 0 | 0 | 3 | 2 | 0 |
| Sweden | 0 | 5 | 2 | 2 | 2 | 3 | 2 | 1 | 2 | 2 | 2 | 0 | 5 | 3 | 3 | 3 | 6 | 8 | 4 |
| United Kingdom | 8 | 6 | 5 | 8 | 9 | 5 | 5 | 5 | 9 | 6 | 7 | 3 | 7 | 13 | 8 | 13 | 24 | 21 | 24 |
| All others | 0 | 0 | 1 | 0 | 1 | 3 | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | 5 | 3 | 7 | 6 | 6 |
| Other Europe | 2 | 7 | 1 | 6 | 6 | 5 | 15 | 7 | 8 | 5 | 10 | 8 | 10 | 12 | 16 | 19 | 14 | 13 | 16 |
| Former Soviet Union | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| Norway | 0 | 3 | 0 | 1 | 0 | 1 | 4 | 2 | 1 | 1 | 2 | 0 | 2 | 1 | 4 | 3 | 2 | 0 | 3 |
| Russia | 0 | 2 | 0 | 3 | 4 | 2 | 3 | 3 | 2 | 1 | 4 | 2 | 4 | 5 | 4 | 10 | 3 | 3 | 3 |
| Switzerland | 2 | 1 | 1 | 3 | 2 | 2 | 8 | 2 | 5 | 2 | 4 | 5 | 3 | 5 | 8 | 6 | 9 | 10 | 8 |
| All others | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| Asia | 193 | 212 | 250 | 272 | 350 | 337 | 311 | 243 | 282 | 294 | 267 | 358 | 554 | 573 | 671 | 802 | 985 | 1,148 | 1,109 |
| China | 1 | 3 | 4 | 2 | 0 | 1 | 4 | 2 | 3 | 3 | 3 | 6 | 24 | 20 | 38 | 29 | 47 | 54 | 54 |
| India | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 0 | 1 | 5 | 0 | 3 | 1 | 7 | 6 | 7 |



| Region, country, or economy | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Japan | 172 | 186 | 220 | 228 | 294 | 278 | 259 | 196 | 226 | 224 | 208 | 243 | 331 | 350 | 427 | 448 | 527 | 563 | 618 |
| Malaysia | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| Singapore | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 1 | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 1 | 2 | 4 | 6 |
| South Korea | 13 | 15 | 16 | 33 | 47 | 44 | 32 | 30 | 39 | 50 | 44 | 91 | 170 | 175 | 182 | 290 | 368 | 466 | 378 |
| Taiwan | 7 | 7 | 10 | 8 | 8 | 13 | 12 | 13 | 12 | 13 | 11 | 17 | 24 | 27 | 20 | 33 | 33 | 52 | 46 |
| All others | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 0 |
| Middle East | 1 | 2 | 2 | 3 | 2 | 1 | 4 | 1 | 3 | 1 | 1 | 3 | 0 | 6 | 5 | 4 | 9 | 7 | 18 |
| Israel | 1 | 2 | 2 | 3 | 2 | 1 | 3 | 1 | 3 | 0 | 0 | 3 | 0 | 6 | 3 | 4 | 5 | 4 | 12 |
| All others | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 4 | 3 | 6 |
| Africa | 1 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 4 | 1 | 0 | 0 | 0 | 1 | 1 |
| South Africa | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 4 | 1 | 0 | 0 | 0 | 1 | 1 |
| All others | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Australia and Oceania | 2 | 2 | 1 | 1 | 2 | 5 | 2 | 3 | 4 | 3 | 5 | 6 | 4 | 6 | 5 | 5 | 6 | 4 | 7 |
| Australia | 2 | 2 | 1 | 1 | 2 | 3 | 2 | 2 | 4 | 3 | 5 | 5 | 3 | 5 | 4 | 5 | 5 | 4 | 6 |
| New Zealand | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 1 | 0 | 1 |
| Unclassified | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

EU = European Union; USPTO = U.S. Patent and Trademark Office.

Note(s)



Patents are fractionally allocated among regions, countries, or economies based on the proportion of residences of all named inventors. The EU includes 28 member countries. China includes Hong Kong. Energy storage includes batteries, compressed air, flywheels, superconducting magnet energy systems, ultracapacitors, hydrogen production and storage, and thermal energy. Technologies are based on a classification developed by The Patent Board.

Source(s)

Science-Metrix, PatentsView and USPTO patent data.

Science and Engineering Indicators 2018