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SNELL & WILMER Member Update

February 19, 2025

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IP Attorney and Proud NAATBatt Member

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Who we are

Snell & Wilmer
Committed to being your perfect fit.®

- Full-service law firm
- NAATBatt Member
- 500+ Attorneys
- 40+ IP attorneys

Who we are

Practice Groups

- Bankruptcy and Reorganization
- Commercial Litigation and Investigations
- Corporate & Securities
- Employee Benefits and Executive Compensation
- Environmental and Natural Resources
- Finance
- Intellectual Property
- Labor, Employment, and OSHA
- Product Liability
- Real Estate and Construction
- Special Ligation and Compliance
- Tax – Federal, International, and State and Local
- Tax – Private Client Services

Please visit our website at **swlaw.com/services** for more information on our service offerings.

Industry Groups

- Aerospace and Defense (A&D)
- Automotive
- Aviation
- Cannabis
- Construction
- Education
- Emerging Business
- Energy and Utilities
- Financial Services
- Fund Formation and Investment Management
- Gaming
- Healthcare
- International
- Life Sciences, Medical Technology, Devices, and Pharmaceuticals
- Mexico
- Military
- Native American Affairs
- Sports and Entertainment
- Telecommunications
- Technology
- Transportation and Logistics
- Unmanned Aircraft Systems (UAS)

We Understand Batteries.

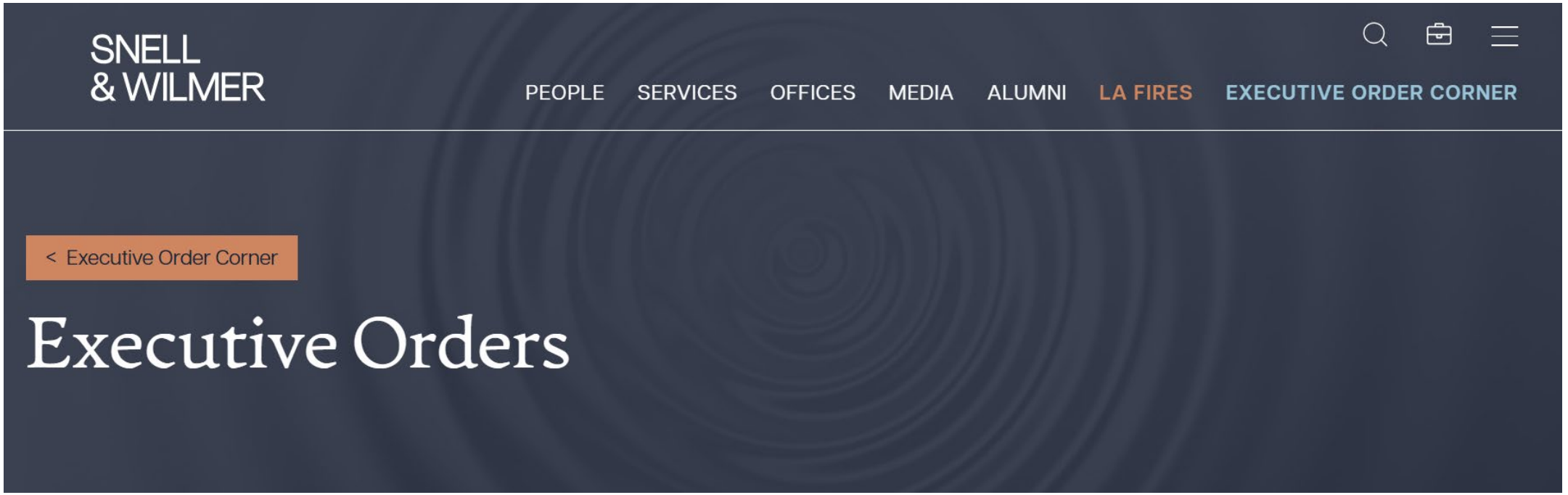
- 40+ IP attorneys
- Battery materials, cells, modules, thermal systems, battery management systems

John Platt

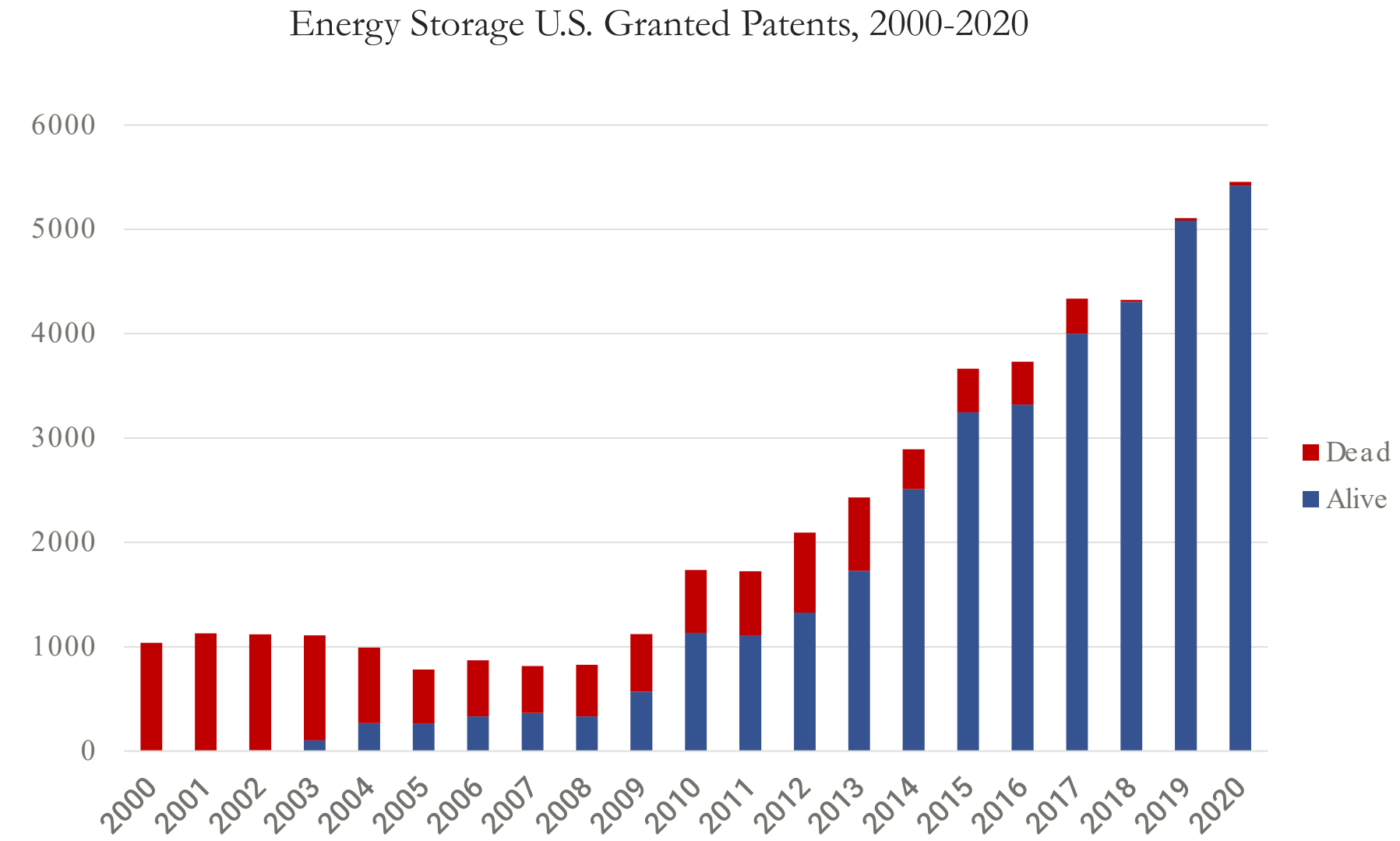
Haley Breedlove

Helpful Resources

- Executive Order Corner
- https://www.swlaw.com/

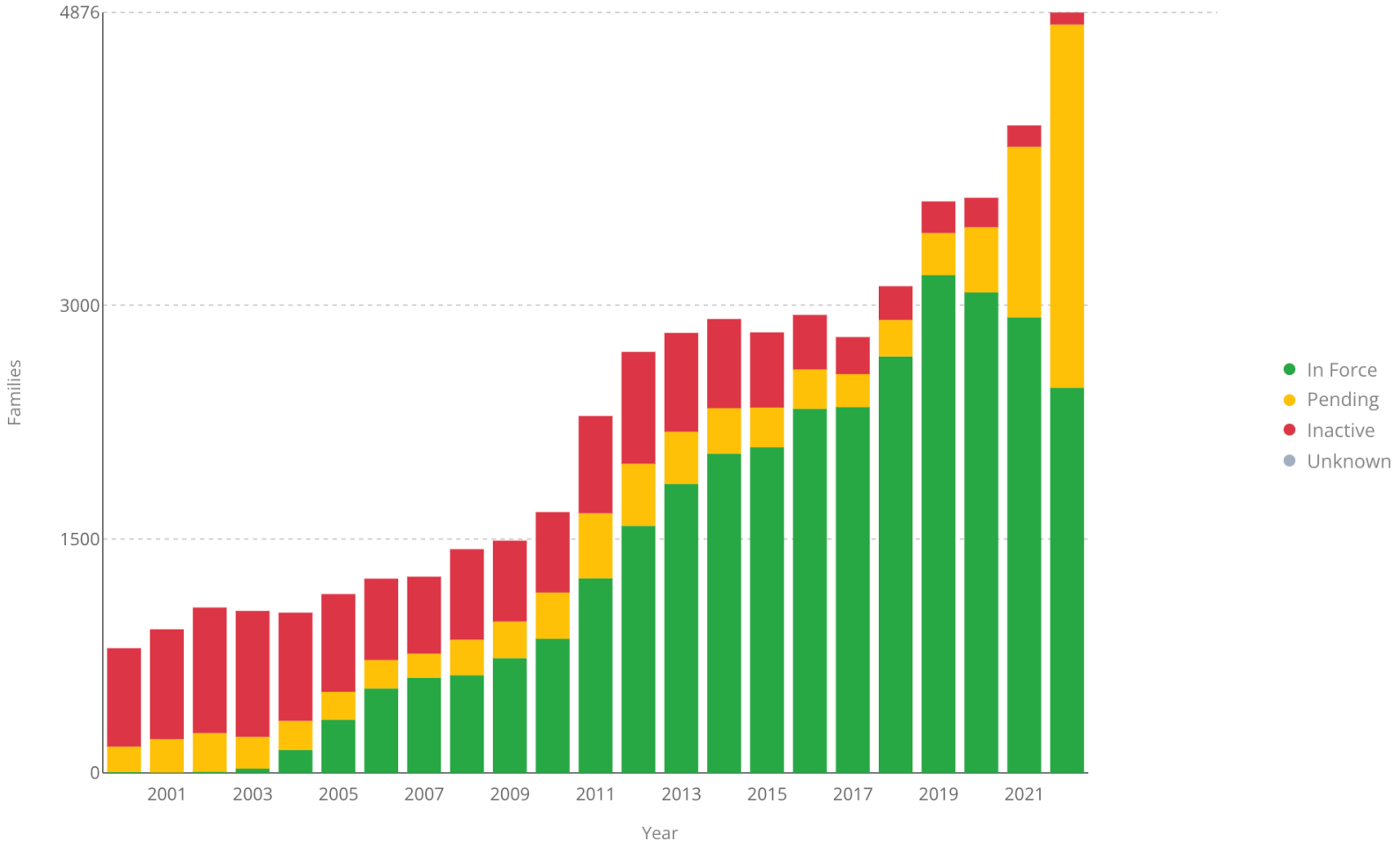


Trends in U.S. Energy Storage Innovation



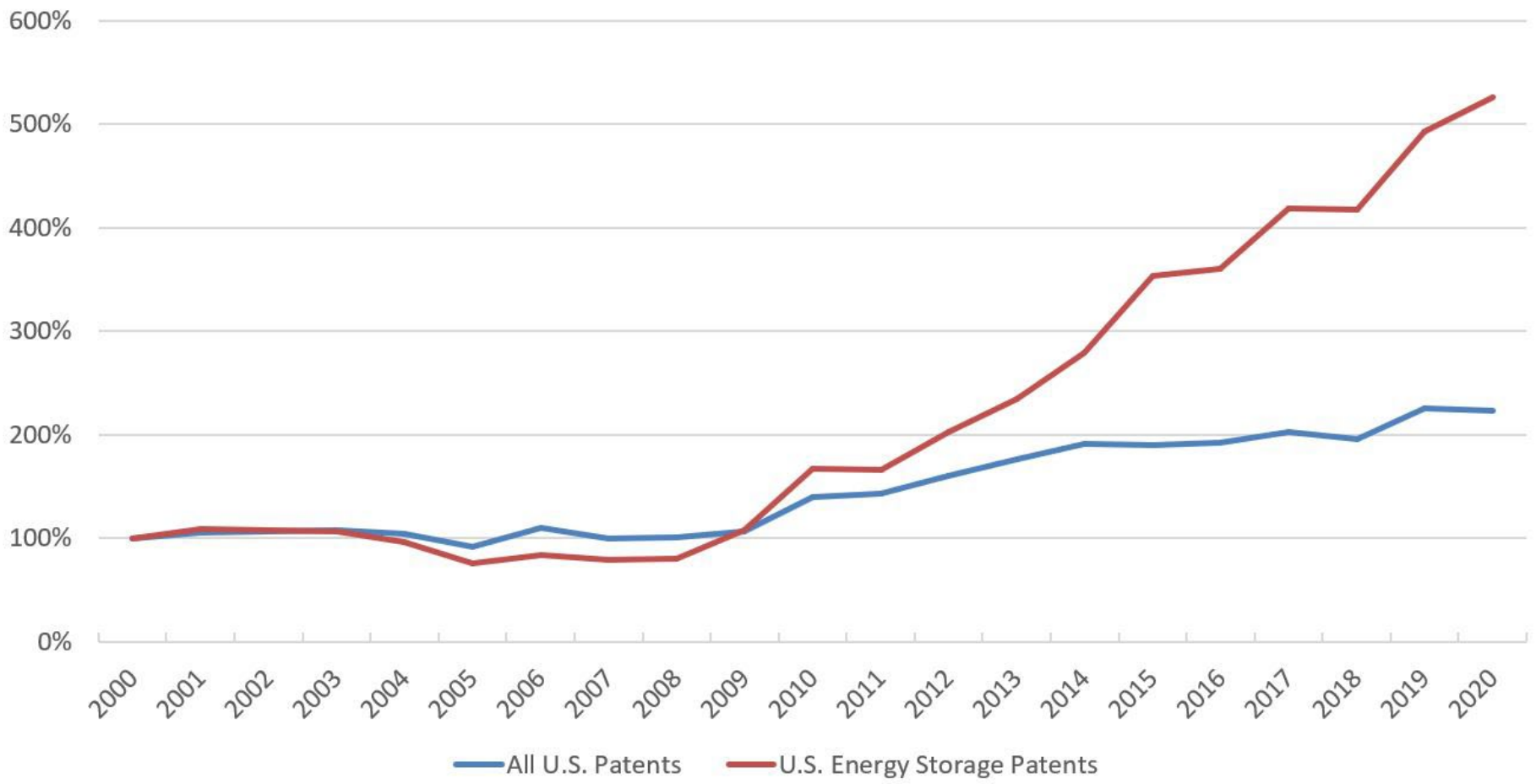
Trends in U.S. Energy Storage Innovation

Battery Energy Storage U.S. Patent families, 2000-2022



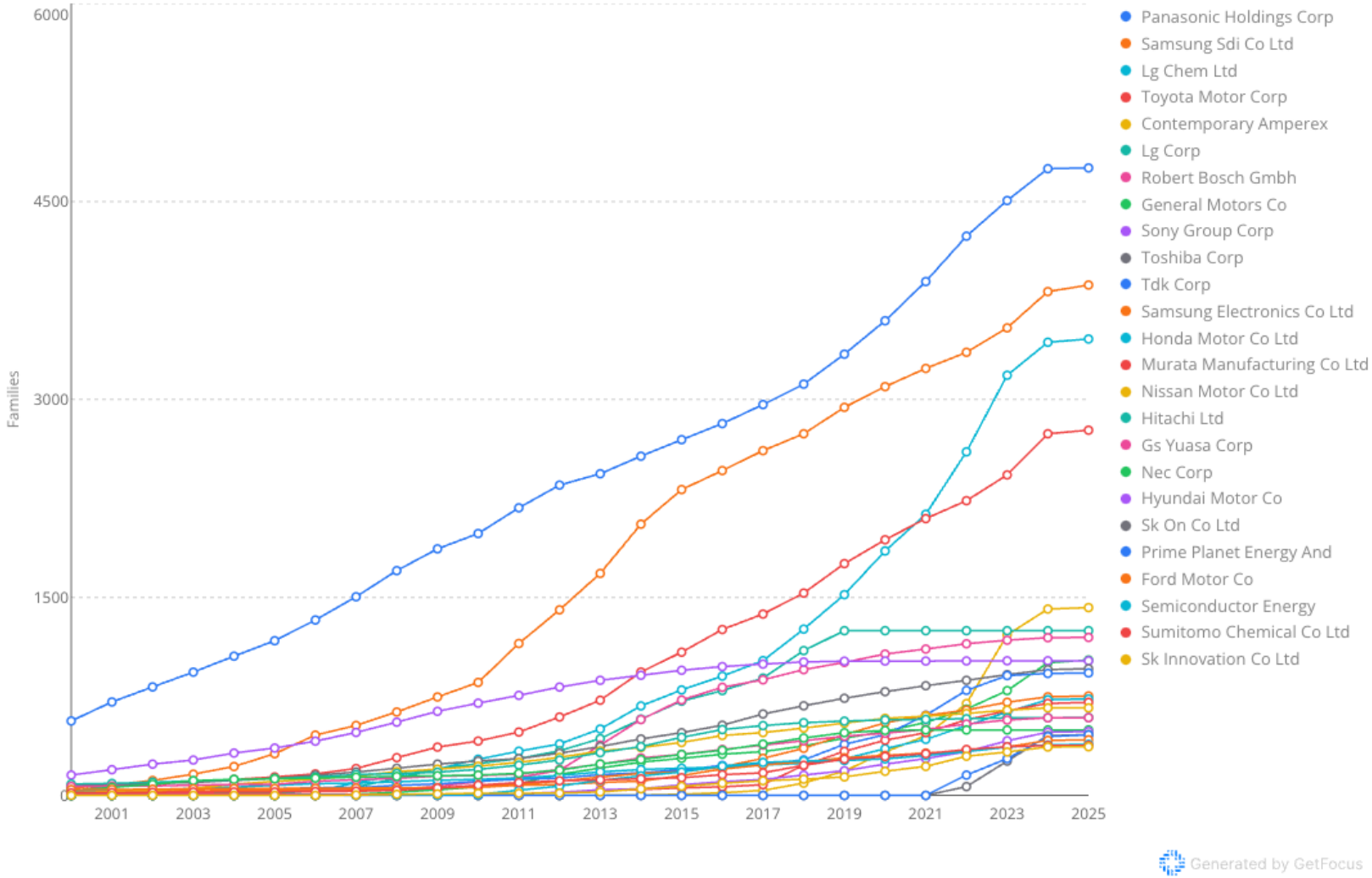
Trends in U.S. Energy Storage Innovation

U.S. Granted Patents 2000-2020, Percent increase over time



Trends in Battery Energy Storage Innovation

U.S. Total Patent families, Top Assignees, 2000-2025



Trends in Energy Storage Innovation

US Granted Patents, Top Assignees vs Grant Year

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
SAMSUNG	8	32	30	37	28	40	57	56	126	259	287	253	348	515	595	473	438	370	407	343
TOYOTA MOTOR	25	38	56	48	40	41	32	41	63	99	140	258	236	280	247	214	281	345	374	408
LG CHEM	0	4	3	8	5	2	13	9	57	69	77	68	110	159	253	209	269	260	344	475
PANASONIC	75	64	93	81	62	69	48	82	92	146	120	181	124	107	103	119	93	107	99	148
HONDA MOTOR	24	27	50	68	67	90	76	73	74	127	91	107	75	91	98	102	94	88	108	108
GM GLOBAL	11	27	31	35	37	28	45	58	66	138	145	123	207	175	175	133	92	65	102	76
SANYO ELECTRIC	39	57	50	43	34	24	32	34	35	55	45	78	62	33	38	40	52	48	72	42
ROBERT BOSCH	0	0	7	1	9	6	6	7	13	21	15	32	73	134	169	140	151	96	131	93
HYUNDAI MOTOR	3	4	1	4	5	8	4	3	6	18	17	27	36	58	64	103	97	130	153	153
TOSHIBA	10	17	13	17	14	18	16	16	32	45	42	43	48	37	33	52	57	48	80	65
NISSAN MOTOR	5	11	22	22	26	36	38	31	36	39	35	41	48	58	61	79	102	76	111	69
MURATA MANUFACTURING	21	20	13	17	7	29	22	18	21	48	26	34	27	73	93	67	103	80	67	69
SONY	15	20	22	32	15	37	33	28	39	48	35	42	48	30	21	17	23	16	9	14
KIA MOTORS	0	0	0	0	0	2	0	0	2	3	3	11	14	22	30	22	23	25	72	127
FORD GLOBAL	8	7	4	6	5	6	4	2	5	5	6	12	13	18	35	77	99	87	110	115
GS YUASA INTERNATIONAL	15	15	13	9	5	8	3	4	11	7	13	14	13	25	60	62	64	80	60	61
GENERAL ELECTRIC	5	1	9	8	11	13	7	7	16	21	18	20	14	17	25	8	16	15	12	8
COMMISSARIAT AL ENERGIE ATOMIQUE	1	2	2	0	0	2	7	3	10	23	19	22	28	33	43	39	38	43	50	40

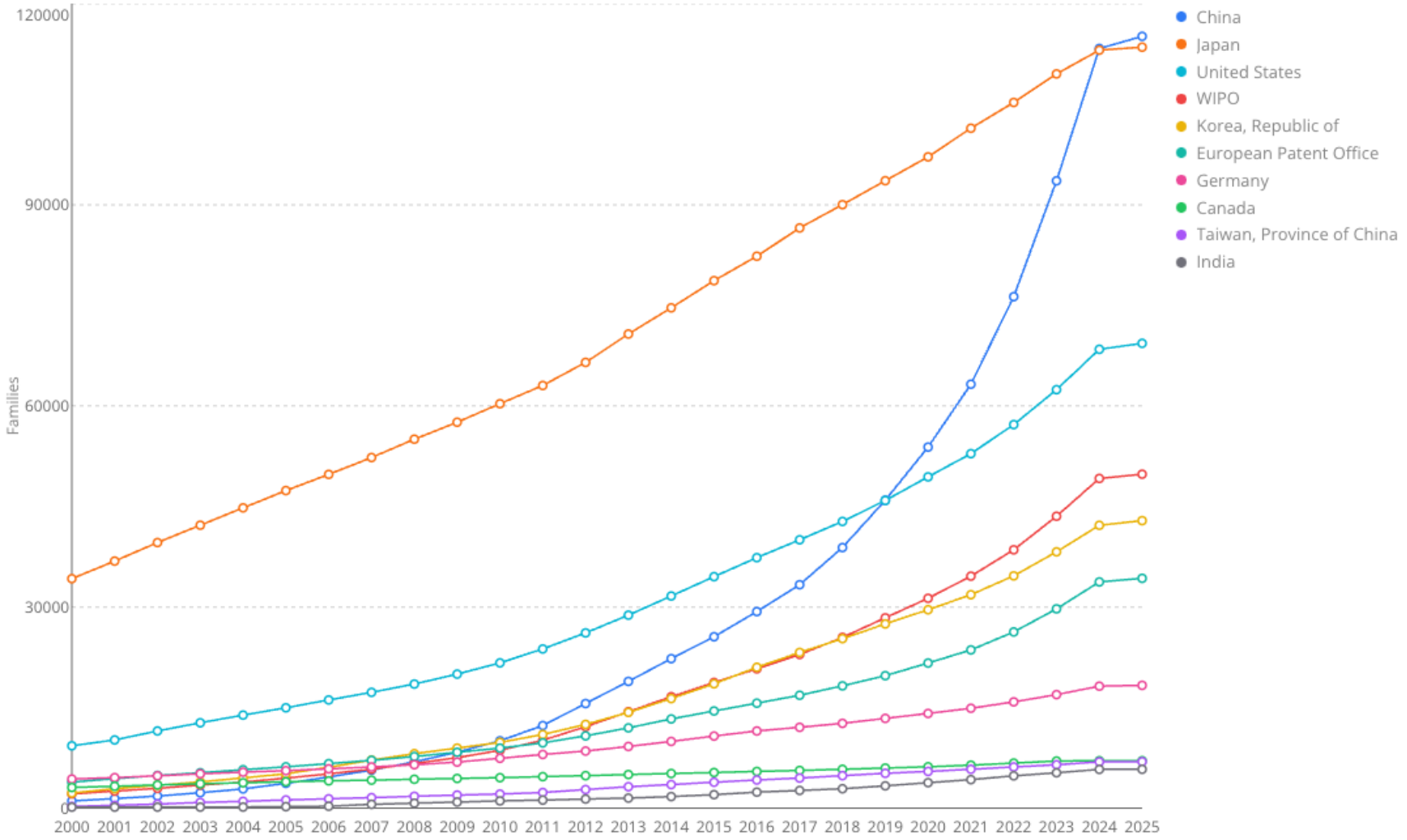
Trends in Energy Storage Innovation

US Granted Patents, Earliest Priority Country vs. Grant Year

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
US	808	766	857	818	734	735	695	684	833	1172	1153	1191	1312	1477	1647	1606	1734	1729	1923	2109
JP	477	604	601	611	488	587	536	574	700	1009	944	1286	1154	1219	1351	1420	1606	1631	1866	1880
KR	36	55	46	52	50	62	81	86	194	367	400	388	507	700	871	747	841	847	1011	1086
DE	75	86	116	109	84	81	70	87	76	119	98	98	114	127	176	186	273	224	267	317
CN	3	2	3	5	1	4	4	7	17	35	57	130	104	91	112	100	130	138	206	309
WO	12	13	16	19	15	16	15	9	15	23	30	66	115	170	183	205	253	218	229	213
FR	28	38	15	17	9	10	20	18	24	51	48	50	62	77	96	95	101	98	111	78
GB	16	23	27	13	15	14	20	25	19	26	25	31	33	32	41	43	73	55	81	59
EP	16	18	12	15	16	19	11	24	15	33	30	34	46	57	62	58	86	88	118	116
TW	9	8	11	16	16	19	20	17	33	41	44	60	56	49	63	62	34	41	58	78
IT	3	5	8	6	6	6	5	8	5	10	12	10	9	14	15	13	10	14	7	11
CA	10	12	13	13	15	7	14	8	7	8	8	9	5	8	3	11	8	7	6	5
SE	9	3	6	4	3	4	2	3	3	4	2	1	2	4	2	4	4	2	3	9
AU	3	4	6	7	4	6	3	6	6	4	8	3	3	2	6	2	5	7	5	10
AT	0	1	1	3	1	1	0	2	2	0	1	5	3	6	5	4	3	4	8	3
NL	3	4	3	4	2	1	3	1	1	3	0	0	0	3	2	1	3	2	3	1
IN	0	0	0	0	0	0	0	0	0	1	0	0	2	2	7	5	7	12	14	8
DK	5	3	0	2	2	0	1	1	4	3	2	7	4	4	4	1	1	0	1	2
IL	3	4	0	1	1	1	0	1	4	2	0	0	3	1	0	1	2	1	1	3
ES	1	2	1	1	1	1	1	0	1	0	0	0	2	2	1	0	0	1	3	1

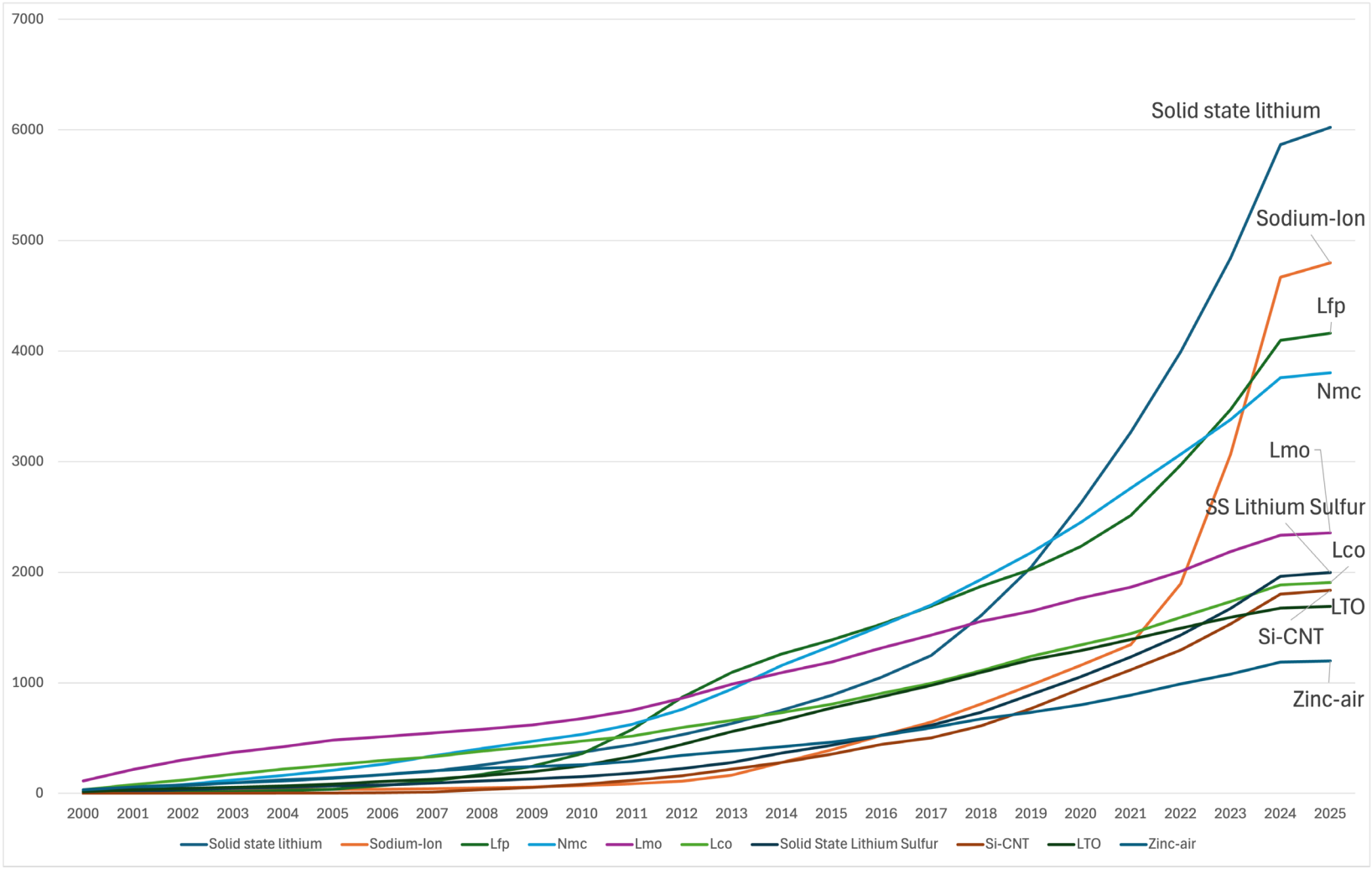
Trends in Energy Storage Innovation

US Patent Families, vs Rest of the World, by Publication Year



Trends in Energy Storage Innovation

Top 10 Battery Technologies by Cumulative Global Published Patents



Trends in Energy Storage Innovation

AI Analysis of US Published Patent Families Since 2020 Reveals These Trends

1. **Diversity and Advancement in Battery Technologies**:
   - There is significant innovation in battery types, with emphasis on lithium-ion, solid-state, lithium-sulfur, zinc metal, and potassium batteries. This indicates a trend towards exploring alternative battery chemistries beyond traditional lithium-ion.
2. **Focus on Safety and Thermal Management**:
   - A large portion of patents focus on enhancing battery safety through features such as protective layers, heat sinks, and technologies to prevent short circuits and overheating. Innovations in thermal management systems are prominent, addressing concerns of thermal runaway and enhancing system reliability.
3. **Advanced Materials and Solid-State Battery Development**:
   - Many patents discuss the use of innovative materials, such as graphene, carbon composites, and novel polymers, to enhance battery performance. Solid-state batteries, featuring solid electrolytes, are gaining traction due to their promise of improved safety and energy density.
4. **Manufacturing Innovations**:
   - There are advancements in manufacturing techniques that focus on improving efficiency and reducing costs. Patents discuss methods like high-pressure assembly and laser welding, reflecting a trend towards more efficient and scalable production processes.
5. **Sustainability and Recycling**:
   - Patents emphasize environmentally friendly materials and sustainable practices, including methods for recycling and reusing battery components, indicating a shift towards more sustainable practices in battery technology.
6. **Performance Optimization and Smart Technologies**:
   - Efforts to optimize battery performance are notable, with patents focusing on improving charge/discharge rates and extending cycle life. The integration of smart technologies for battery management, including systems that monitor battery health and performance, is also a trend.
7. **Hybrid and Modular Battery Designs**:
   - There are developments in hybrid battery systems that combine different chemistries and modular designs that allow for scalability and ease of maintenance, particularly for applications in electric vehicles and renewable energy systems.