

Green Transformation (GX)?

"An initiative to reduce carbon dioxide emissions by advancing the use of energy sources that place less burden on the natural environment, such as solar power and hydrogen, without relying on fossil fuels. Additionally, it is an initiative to transform society as a whole to make these activities an opportunity for economic growth." (METI Journal ONLINE)

Background to "GX"

To fulfill this commitment, it is considered necessary to transform the very structure of society. Moreover, viewing these efforts as opportunities for economic growth and enhancing industrial competitiveness will be crucial. The initiative required to achieve this is "GX," which stands for the transformation of the entire economic and social system.

GXTI?

GXTI (Green Transformation Technologies Inventory) is a technology classification table created by the Japan Patent Office ("JPO") in June 2022 to provide an overview of technologies related to 'GX.' This classification table also includes patent search formulas for retrieving patent documents categorized under each technology section.

Analysis of Specific Technologies in DXTI

Transitions in the number of applications for specific technologies in DXTI

Secondary batteries EVs/HEVs Table 6-1 Annual trends in the numbers of IPF
(Application to the country/region to be surveyed, the filing years (priority years): 2010 to 2021)

| Level 1 | Level 2 | Level 3 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Total |
|---|-------------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|--------|
| Energy Supply | Business | gaA07b | 489 | 498 | 432 | 374 | 259 | 238 | 180 | 152 | 142 | 141 | 143 | 27 | 5,071 |
| | | gaB01a | 5,303 | 6,157 | 6,234 | 6,141 | 5,460 | 5,201 | 5,554 | 5,404 | 5,019 | 4,354 | 3,333 | 856 | 59,246 |
| Demand-Supply | Flexibility | gaB03a | 1,969 | 2,428 | 2,375 | 2,349 | 2,318 | 2,363 | 2,494 | 2,408 | 2,391 | 2,322 | 899 | 32 | 32,492 |
| | | gaB00b | 353 | 337 | 323 | 370 | 368 | 358 | 425 | 514 | 524 | 540 | 463 | 58 | 4,682 |
| Batteries, Energy Storage | Chemical | gaC01a | 4,371 | 5,060 | 5,112 | 4,904 | 4,842 | 4,996 | 4,916 | 4,935 | 4,723 | 4,421 | 1,868 | 65 | 65,037 |
| | | gaC01b | 24 | 22 | 46 | 48 | 37 | 50 | 58 | 49 | 73 | 51 | 47 | 6 | 513 |
| CO2 Reduction in Non-Energy Sectors | Recycling | gaE01a | 253 | 287 | 260 | 277 | 236 | 219 | 267 | 242 | 279 | 488 | 577 | 127 | 3,512 |
| | | gaE01c | 106 | 125 | 129 | 119 | 129 | 118 | 132 | 139 | 151 | 117 | 115 | 23 | 1,400 |
| Capture, Storage, Utilization and Removal of Greenhouse Gas | Chemical | gaE01b | 56 | 54 | 72 | 76 | 68 | 75 | 87 | 98 | 101 | 83 | 98 | 30 | 895 |
| | | gaE02a | 105 | 71 | 110 | 101 | 122 | 117 | 113 | 139 | 121 | 136 | 88 | 13 | 1,238 |

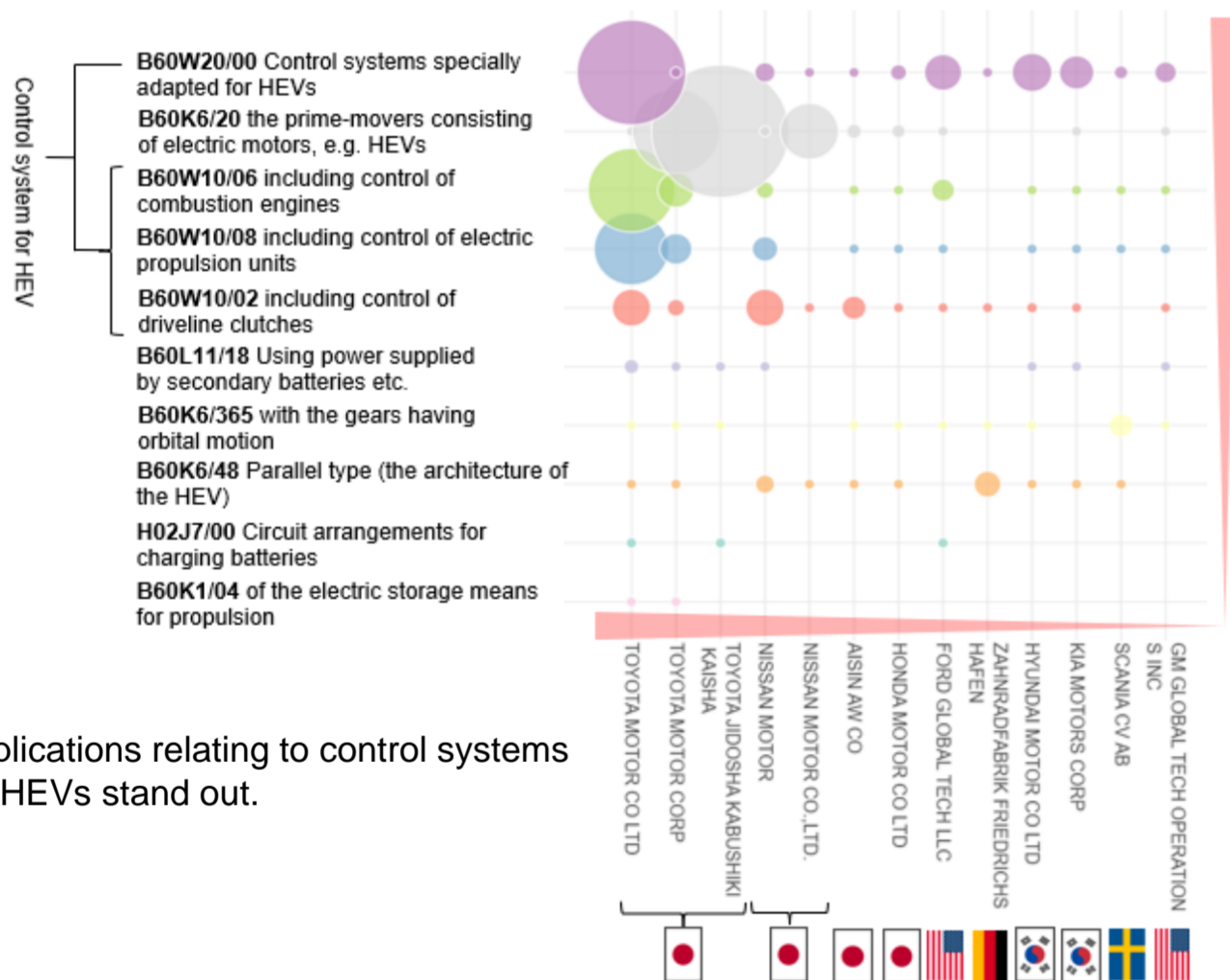
Source: Patent information analysis based on GXTI (summary), Japan Patent Office Database: Derwent™ Innovation

The number of applications for technologies relating to "EVs/HEVs" and "secondary batteries" is increasing.

→ We analyzed these technologies in more detail.
※Each analysis was performed on 1,000 patent applications that the AI determined to be particularly relevant to the above technologies

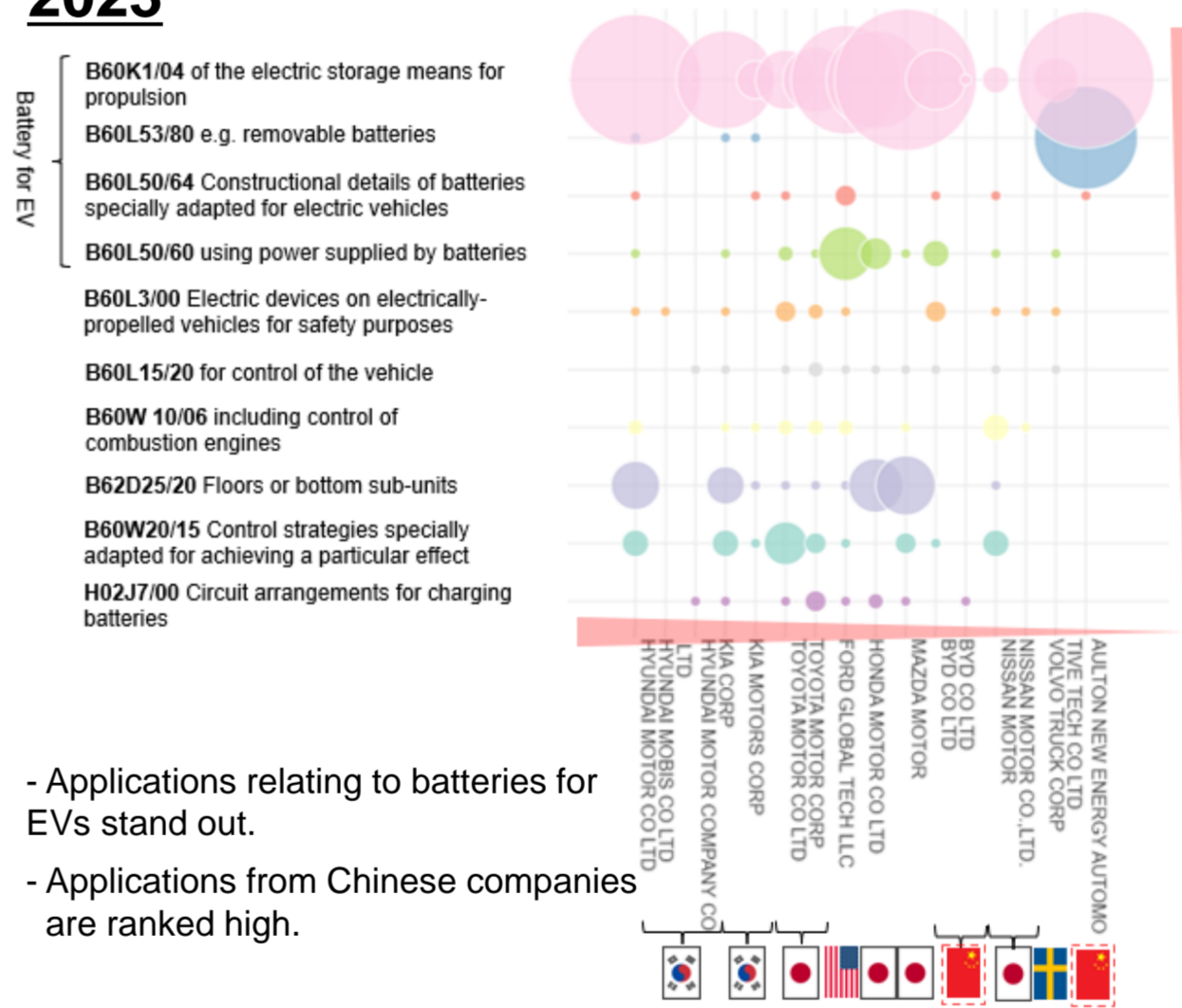
Relation between Applicants and Top IPC about EV/HEV

2014



- Applications relating to control systems for HEVs stand out.

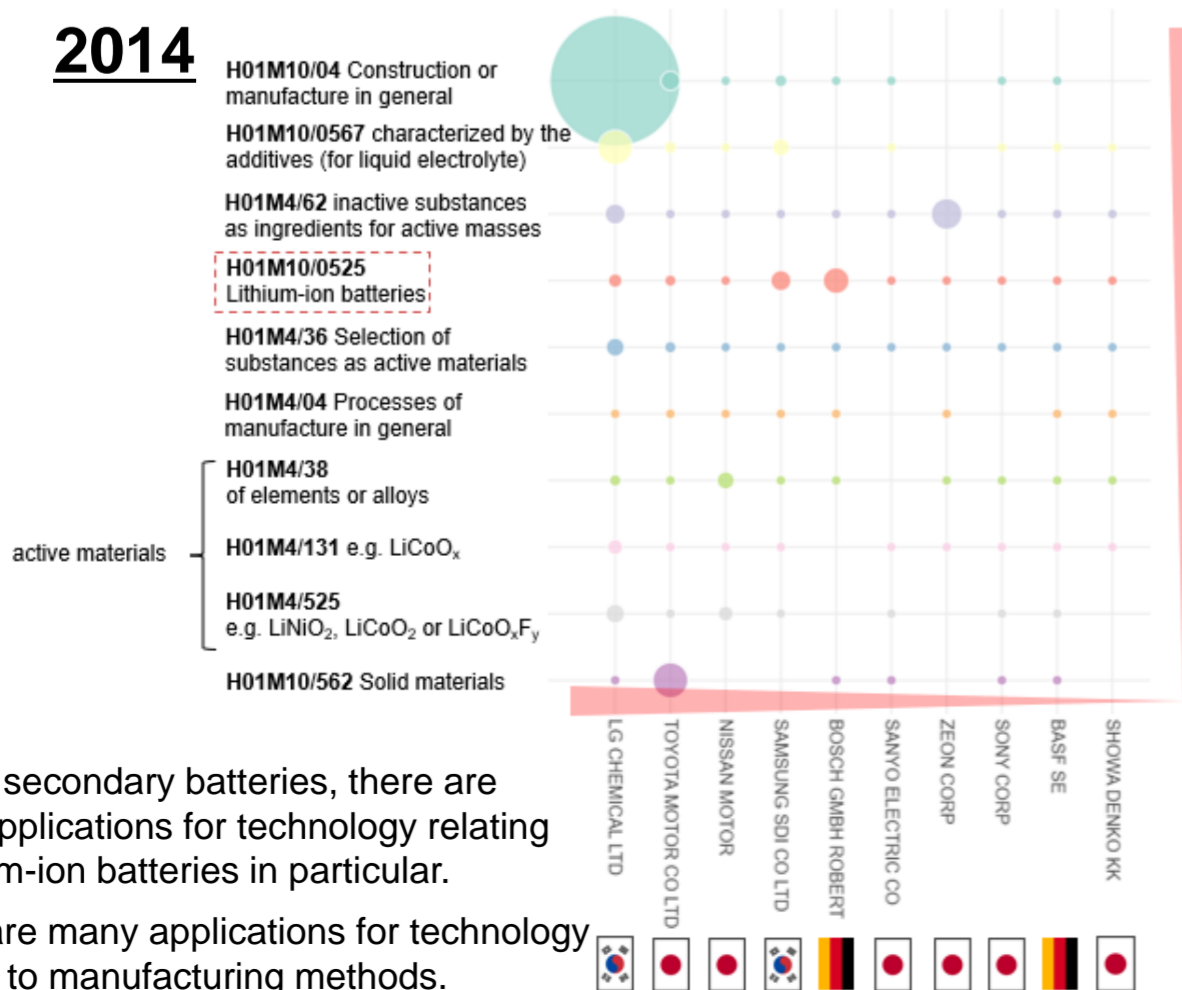
2023



- Applications relating to batteries for EVs stand out.
- Applications from Chinese companies are ranked high.

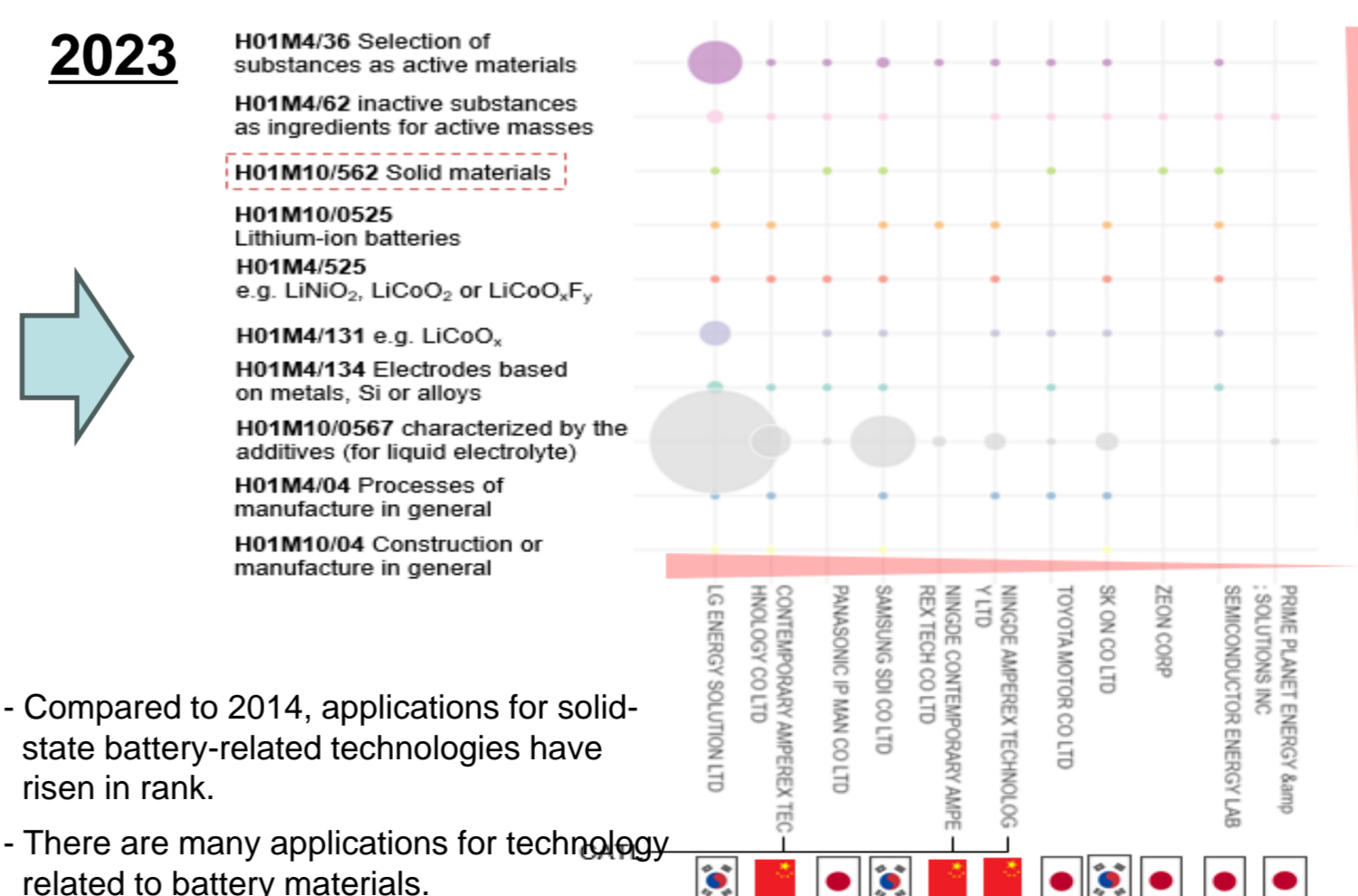
Relation between Applicants and Top IPC about Secondary Batteries

2014



- Among secondary batteries, there are many applications for technology relating to lithium-ion batteries in particular.
- There are many applications for technology relating to manufacturing methods.

2023



- Compared to 2014, applications for solid-state battery-related technologies have risen in rank.
- There are many applications for technology related to battery materials.