

Data Insight

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The Implications for the Power Sector of Innovation by Startup Companies

We compiled a multi-regional database of 320 startups from 36 countries whose focus is on new technologies in the electricity sector. To reach this number, we performed internet searches with neutral key words such as ‘startups,’ ‘electricity,’ ‘innovation,’ and avoided searching for specific technologies to reduce biases. We used four languages for these searches: Arabic, Chinese, English and Spanish. The searches returned companies that were either referenced in newspaper articles, received public or venture capital funding, won competitions or are acknowledged by industrial bodies as firms to follow. We then verified the existence of these companies by visiting their websites and/or Twitter accounts, which were also recorded in the database.

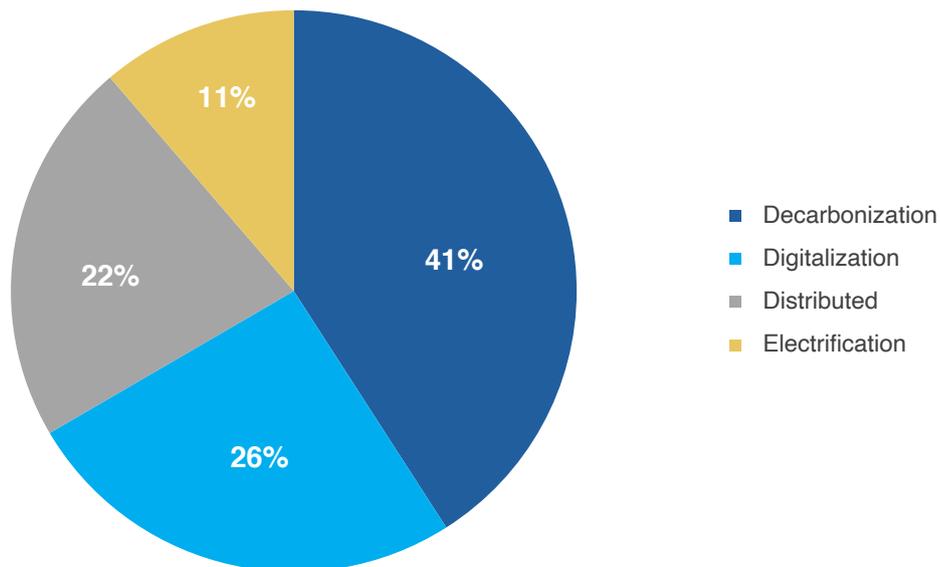
From these searches we constructed a database that recorded the startups’ descriptions of their business models. We benchmarked these descriptions against megatrends that are discussed in the electricity literature: decarbonization, digitalization, distributed generation, and electrification.

Table 1 describes the four megatrends that startups are pursuing, and Figure 1 provides a breakdown of these trends.

Table 1. Megatrends in the electric power sector based on innovations in startups.

| Trend | Description |
|-----------------|---|
| Decarbonization | Efforts oriented to reduce carbon emissions in the electricity sector or to decouple electricity from carbon emissions. Indicates a transition toward a clean and carbon-free economy by integrating and increasing the share of renewable energy sources. |
| Digitalization | Application of digital or information technologies in the electricity sector. These technologies were not designed specifically for the energy sector. Implies the widespread use of digital machines and devices at all levels of the power system, from production and infrastructure to end-user devices. Enables the industry to implement intelligent energy and power management solutions based on machine-to-machine and machine-to-human interactions. |
| Distributed | General trend to break from the vertically integrated paradigm. Refers to geographically distributed electricity with many multi-level producers and consumers. Besides, decentralization enables lower energy intensity and provides opportunities for utilizing renewable sources of energy. |
| Electrification | Use of electricity in economic sectors that have traditionally used other fuels. |

Figure 1. Startups by megatrend (%).



These startups are concentrated in the United States (U.S.) (20%), United Kingdom (14%), Europe (20%), China (21%), and in a very few developing countries except for India. Firms from the Gulf Cooperation Council and the Middle East focus almost exclusively on deployment of photovoltaic solar generation. China’s startups focus on batteries and storage for electric vehicles (EVs) and the manufacturing of EVs themselves, something we did not find in the U.S. or Europe outside the incumbent automobile firms.

The database is publicly available and is located at [Startups leading innovation in the electricity sector – KAPSARC Data Portal](#)

Reference

Fuentes, Rolando, Dongmei Chen, Frank A. Felder. 2022 (forthcoming). “Startups and Innovation in the Electricity Sector.” KAPSARC Discussion Paper.

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