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# Battery Fire Risk as a Function of Facility Size

Data from the EPRI BESS Failure Incident Database:
https://storagewiki.epri.com/index.php/BESS_Failure_Incident_Database

Because battery facilities are modular and failure occurs at the cell or module level, the overall rate of failure is proportional to the quantity of batteries present. Quantity is measured in gigawatt-hours or megawatt-hours. One gigawatt-hour = 1,000 megawatt hours.

Note: "Gigawatts" or "megawatts" (without "-hour") is **not** a measure of battery quantity, storage quantity, or physical size of battery facilities. Rather, it is the maximum discharge rate (i.e., energy flow rate) out of battery facilities. Gigawatts x hours of storage = gigawatt-hours.

| | 2020 | 2021 | 2022 | 2023 | Average |
|---|---|---|---|---|---|
| Incidents per year | 4 | 12 | 15 | 15 | |
| Gigawatts | 6.2 | 13.4 | 27.6 | 51.5 | |
| Gigawatt-hours of storage* | 16.9 | 36.6 | 75.0 | 140.1 | |
| **Incidents/Gigawatt-hour per year** | **0.24** | **0.33** | **0.20** | **0.11** | **0.22** |

*Based on 2.72 hours storage, the weighted average of reported facilities in the EPRI Failure Incident Database table. This assumes that, in terms of storage hours, the facilities in the EPRI table are a representative sample of the overall fleet. It can be reasonably argued that facilities with higher storage hours are overrepresented in the EPRI table, since larger facilities are more likely to incur failures. To the extent this argument holds true, the 2.72 hours storage figure is higher than actual, and the "0.22 Fires/Gigawatt-hour per year" figure is lower than actual (i.e., it understates the fire risk).

**Seguro Battery Installation (1,280 megawattt-hours):**

Projected fires per year = 1,280 megawatts-hours x (0.22 fires/1000 megawatt-hours per year) = **0.279**

Probability of fire each year = **27.9%**

Projected number of fires over 60 years**= 0.279 fires/year x 60 years = **16.7**

**Small, Postulated Residentially-Sited Battery Installation (8 megawatt-hours):**

Projected fires per year = 8 megawatts-hours x (0.22 fires/1000 megawatt-hours per year) = **0.002**

Probability of fire each year = **0.2%**

Projected number of fires over 60 years**= 0.002 fires/year x 60 years = **0.1**

Probability of fire over 60 years = **10%**

**The typical "design life" of an energy facility, whether natural gas fueled, solar, wind, or batteries, is 30 years. However, the actual operating life of a facility, or the time span over which a site can be expected to remain devoted to a given energy industry use, is typically twice the design life or more. Examples in San Diego County include the Station B Power Plant in downtown San Diego (1921-1983), South Bay Power Plant in Chula Vista (1960-2010), and Encina Power Plant in Carlsbad (1954-2018). Power substation and switchyard sites generally can be expected to remain in that land use for 100 years or more. Irrespective of the design life of individual components, energy industry sites remain active in their established use as long as it is economical and/or expedient to do so.