November 11, 2026

People Make Mistakes, and Things Break.
-Considering the Risks of Electric Power-

Tomoko Murakami
Senior Fellow
Electric Power Industry Unit
The Institute of Energy Economics, Japan

On October 24, a fire broke out at a wind turbine facility (Unit 2 of Tohaku Wind Power Plant, 1,500 kW) in Kotoura Town, Tottori Prefecture. The fire was soon extinguished, and the operator disclosed information regarding the incident on their website that same day with the fact that there were no human casualties[1]. At a briefing for local residents held on November 7, the operator stated that no abnormalities had been detected during a periodic inspection conducted two days prior to the fire, and that there had been no adverse weather conditions, such as lightning strikes, on the day of the incident. The cause is currently under investigation[2].

During the briefing, residents expressed their anger over several issues: the operator did not arrive at the site until four days after the fire; no concrete explanations were provided regarding the circumstances of the incident or potential compensation for local farmers; and a blade failure had occurred at the same facility six years earlier. While it would be irresponsible for outsiders to comment on the feelings of those whose daily lives or livelihoods have been directly affected, I would like to consider whether this incident is a "severe accident,[3]" and how we ought to perceive the risks associated with incidents involving electrical power infrastructure, including this particular case.

Various organizations, both domestic and international, publish statistics and analyses regarding the number and types of incidents involving electrical equipment. Figure 1 presents data from a 2025 study by a group of university researchers in Mexico, showing the trend in the number of fire incidents at wind power installations worldwide from 2000 to 2024[4]. The left vertical axis represents the annual number of fire incidents according to the study, while the right vertical axis shows the fire incidence rate, calculated by dividing the number of incidents by the global installed capacity of wind power (in GW).

---

[1] Japan Wind Development Co., Ltd., *Notice of a Fire Incident*, October 24,2026, https://www.jwd.co.jp/news/2026102402/ (Japanese only)
[2] BSS San-In Broadcast News, *Two weeks after a wind turbine fire in Kotoura Town, Tottori Prefecture, the operator provides an explanation to the local community; residents express anger and dissatisfaction over the slow response*. November 8, 2026, https://news.yahoo.co.jp/articles/c95d8926a3ab9c0522a264897e7852e1534f33de (Japanese Only)
[3] The official definition of "severe accidents" is that meets any of the following criteria: 1) One or more fatalities; 2) Two or more seriously injured persons, 3) One or more seriously injured persons and three or more injured persons, 4) Six or more injured persons, 5) Significant property damage due to an explosion, fire or similar event. (Referred from "Electrical Safety Statistics, FY 2024", The Ministry of Economy, Trade and Industry.)
[4] Palacios A.et al, *Historical Analysis of Wind Turbine Fire Incidents*, Chemical Engineering Transactions, Vol.116, 2025; https://www.cetjournal.it/cet/25/116/120.pdf

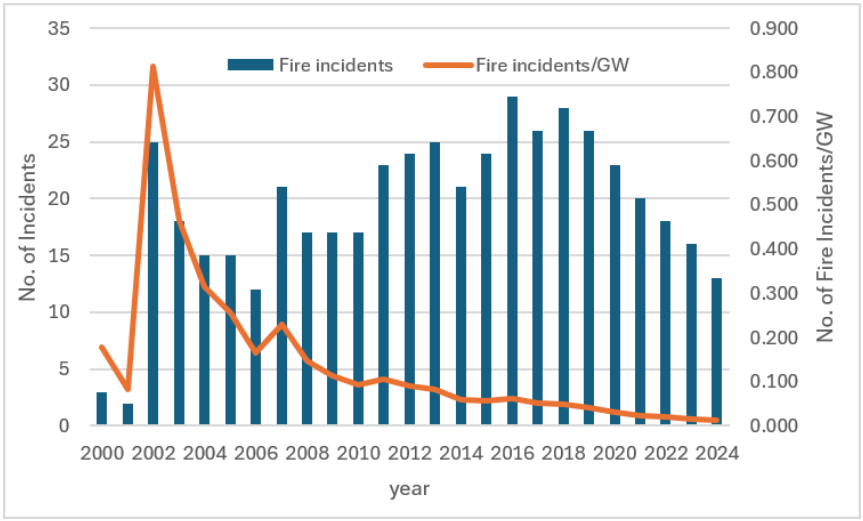


Figure 1. Trend in the number of fire incidents, fire incidence rate per GW worldwide Source) Palacios A.et al (2025)

According to this data, the incidence of fires per unit of installed capacity has shown a consistent downward trend from 2002 through recent years. While the researchers note the limitations of their study—pointing out that the recorded number of fires reflects only those that were publicly reported (with some accounts suggesting the actual figure is significantly higher) and that information for 2000 and 2001 was particularly limited—the decline in fire incidence rate is a plausible trend, considering that wind power facilities have become more resilient to natural disasters, such as lightning strikes, over the past two decades.

However, the fact that the number of fires is on the decline, averaging approximately 0.01 incidents per GW in recent years, which translates to fewer than one fire per year in Japan, where total installed capacity exceeds 6 GW—does not necessarily mean that wind power facilities are inherently "safe." Further analysis is required, including comparisons with other power sources, such as solar power, which is also a variable renewable energy source, and thermal power generation, which currently accounts for the largest share of power generation in Japan.

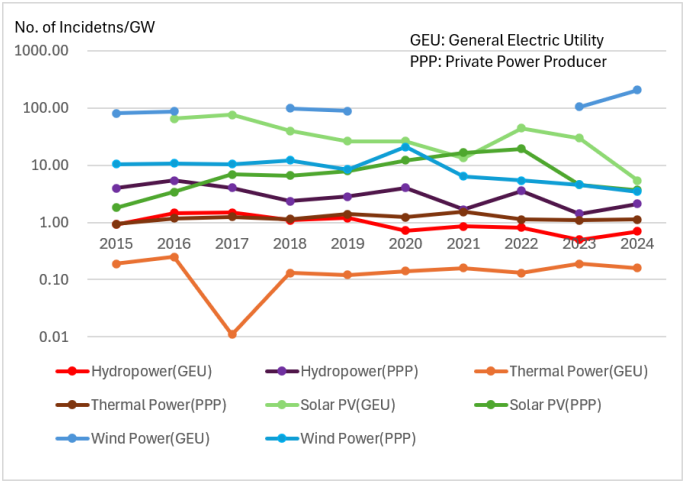


Figure 2. Trends of the incidence rate per GW by power sources Source) METI.

Japan is one of the few countries in the world where information regarding incidents by electrical facilities is shared and made publicly available; the Ministry of Economy, Trade and Industry (METI) publishes data on the number and types of such incidents, categorized by type of electrical facility, in its "Statistics on Electrical Safety."[5] Figure 2 illustrates the trends over the past decade in the incidence

[5] METI, *"Current Status of Electrical Safety (Overview of Electrical Safety Statistics for Fiscal Year 2024),"* March 2026, National Institute of Technology and Evaluation (NITE); https://www.meti.go.jp/policy/safety_security/industrial_safety/sangyo/electric/files/r6_hoantokei_gaiyou.pdf

rate per GW of capacity broken down by power source (hydroelectric, thermal, solar, and wind).

According to the data, the incidence rate per unit of installed capacity for wind and solar power is an order of magnitude higher than that for thermal or hydroelectric power. While this encompasses all types of incidents—including minor damage and cases without human harm—it is easy to see why these systems might be more prone to issues like degradation or electrical leakage, given that, unlike thermal power facilities, they are situated outdoors and literally "exposed to the elements." Meanwhile, it may be more significant to note that the incidence rate for thermal power—a core energy source—is kept remarkably low, at around 0.1 per GW.

The same statistics track "severe accidents" in terms of both the number of occurrences and the accident rate, distinguishing them from minor incidents. Figure 3 illustrates the trends in the number and rate of accidents—including casualties, electrical fires, and damage to electrical facilities—associated with solar and wind power facilities. These data indicate that there is no significant difference in the rate of severe accidents between solar and wind power, and that for both, the number of accidents per GW has generally remained below 1.

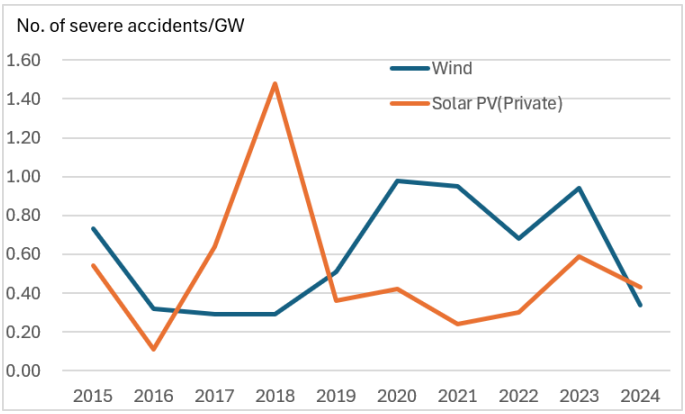


Figure 3. Trends of the severe accidents per GW in solar PV and wind Source) METI.

Another previous study, the "Our World in Data (OWID)" project[6], which compared the risk of death by power source, found that the number of deaths per amount of power generation was 0.019 (persons/TWh, same below) for solar power and 0.035 for wind power, which are generally consistent with the Electrical Safety Statistics mentioned above. For reference, the number of deaths per power generation for other fuels in the OWID project is 24.62 (persons/TWh) for coal, 18.43 for oil, and 2.82 for gas. Although property damage incidents due to natural deterioration or maintenance deficiencies occur everywhere, wind and solar power can be said to be “safe enough” when it comes to severe accidents that include human injury.

"People make mistakes, and things break"—this is a fundamental principle of engineering. No human being can eliminate errors entirely, and no matter how precisely equipment is manufactured, it is impossible to completely prevent deterioration or failure. Given this reality, it is essential to operate on the premise that "people will occasionally make mistakes" and "things will eventually break." This requires not only implementing measures to prevent failures and damage but also focusing on mitigating the impact of incidents and safeguarding against human harm. Furthermore, it is crucial to

[6] Our World in Data, *Death rates per unit of electricity production,* https://ourworldindata.org/grapher/death-rates-from-energy-production-per-twh

employ a multi-layered approach to these safeguards and to maintain ongoing communication with the public.

At the same time, in a world where things eventually break, we should also recognize how remarkable and worthy of pride it is that a power facility could complete its 20-year lifespan without a single incident. In May 2026, the decommissioning of the Eurus Soya Misaki Wind Farm (57,000 kW; 57 turbines of 1,000 kW each) in Wakkanai, Hokkaido, began[7]. Throughout its approximately 20 years of operation—from November 2005 to April 2026—no equipment failures or human casualties were reported at the facility.

Eurus Energy, the operator, is considering a plan to replace the existing facilities to continue harnessing the region's abundant wind resources and contribute to local revitalization. Given that the wind turbines, located on the expansive Soya Ranch, have long been cherished by local residents—forming part of the scenic "White Road" (Shiroi Michi)—and have coexisted with the local dairy farming industry, this plan is likely to receive support from the community.

No technology for electric power is entirely free of risk. This raises the question: what level of risk is acceptable, and what level is intolerable? For instance, should a fire incident that resulted in no human casualties be considered within the "acceptable" range or not? It is time to revisit the question that has long been debated within the nuclear power industry—"How safe is safe enough?"—and apply it to the energy technologies that surround us today.

Contact: report@tky.ieej.or.jp



Photo: Eurus Soya Misaki Wind Farm, September 2019, by T. Murakami

[7] Eurus Energy, *Decommissioning Work began at Eurus Soya Misaki Wind Farm*, May 1, 2026; https://www.eurus-energy.com/news/2026/20260501-2670.html