

Peer Response

by [Matthew Bullen](#) - Sunday, 10 August 2025, 6:40 PM

I think that this discussion is a good illustration of the “resilience” factor of Industry 5.0 systems, or the ability of Industry 5.0 systems to respond to unforeseen events without (or with minimal) loss of functionality, and to restore impaired functioning without (or with minimal) human intervention (Alves, Lima and Gaspar, 2023).

As noted in the original post, resilience is a critical factor in infrastructure such as energy management utilities. A power outage not only has the potential to cause temporary economic losses from cessation of labor, insurance claims, and similar derivative consequences, it can – in severe cases – also lead to damaging the capacity of the system itself to function at needed levels in the future and/or cause otherwise avoidable injury or loss of human life (Introna, Santolamazza and Vittorio, 2024).

In that sense, an Industry 5.0 system should be built with resilience as a foreground principle. Such a system would not only be built to do what it was intended to do as well as it possibly can per the Industry 4.0 paradigm (Alves, Lima and Gaspar, 2023), but also be built with multiple layers of automated defenses against events that could cause impaired functionality, along with multiple avenues for automated damage mitigation and self-repair in the event of deleterious incidents (Introna, Santolamazza and Vittorio, 2024).

References

Alves, J., Lima, T.M. and Gaspar, P.D. (2023). Is Industry 5.0 a Human-Centred Approach? A Systematic Review. *Processes*, 11(1), p.193. doi:<https://doi.org/10.3390/pr11010193>.

Introna, V., Santolamazza, A. and Vittorio Cesarotti (2024). Integrating Industry 4.0 and 5.0 Innovations for Enhanced Energy Management Systems. *Energies*, 17(5), pp.1222–1222. doi:<https://doi.org/10.3390/en17051222>.

Peer Response

by [Eslam Salaheldin Abdelnaser Abdelhafez](#) - Tuesday, 12 August 2025, 7:11 PM

Hi Abdulrahman,

I find your analysis of the Texas grid failure as a case study in the limits of Industry 4.0 implementation insightful. The incident not only exposed infrastructural fragility but also highlighted the absence of systemic foresight. I agree that this is an area where Industry 5.0 principles could have made a tangible difference. Building on Matthew's point about resilience, I would also add that Industry 5.0's emphasis on human-machine collaboration is especially relevant in energy systems. As Introna et al. (2024) argue, integrating AI with human decision-making enables dynamic risk assessment and adaptive response strategies, which is critical during cascading failures like the Texas blackout. The lack of predictive modelling and real-time coordination was not just a technical oversight. Rather, it reflected a governance gap where human expertise was under-leveraged.

Moreover, the economic and human toll of the blackout highlights what Brem et al. (2021) describe as the ethical imperative of Industry 5.0: designing systems that safeguard life and livelihood, not just optimise performance. The tragedy was not merely a failure of technology, it was also a failure to anticipate and centre human needs in system design.

All in all, your post effectively bridges the theoretical promise of Industry 5.0 with the practical consequences of its absence. It is a reminder that resilience is not just about redundancy, but it is majorly about responsibility.

Reference List

Brem, A., Viardot, E. and Nylund, P.A. (2021) *Industry 5.0: A Human-Centric Solution*. Bingley: Emerald Publishing Limited.

Introna, V., Santolamazza, A. and Cesarotti, V. (2024) 'Integrating Industry 4.0 and 5.0 Innovations for Enhanced Energy Management Systems', *Energies*, 17(5), p.1222. doi:10.3390/en17051222.

Peer response

by [Jose Torres](#) - Tuesday, 19 August 2025, 6:16 AM

This article is particularly relevant to me, as I have been witness to the developments observed in the energy management sector since I begin my employment in a electrical management company in 2023. Industry 5.0 represents a direction focused on combining sustainability with technological advancements. Strategies implemented by companies (including mine) in this field include developing software integrated with artificial intelligence to monitor electrical installations for potential issues and provide real time recommendations for energy usage.

We must remind ourselves that Industry 5.0 advocates for a balanced approach that leverages technology to enhance human capabilities while ensuring environmental protection and resource efficiency (Rame et al, 2024). To uphold Industry 5.0's principles, we must ask how to ensure everyone can access technology that supports community inclusion in these advancements. It will require a global effort from governments, responsible for creating initiatives always protecting the human element, and companies, who must maintain a balance between profitability and responsibility. This can be a tricky thing as political, logistical, and supply chain uncertainties can deter industries from embracing this approach, making it critical for stakeholders to address these hurdles strategically. (Rame et al, 2024)

In summary, the convergence of sustainability and advanced technology in Industry 5.0 not only transforms how we approach energy management but also inspires continuous innovation within the sector. As companies embrace intelligent solutions, the future promises greater efficiency, resilience, and a more responsible stewardship of our resources.

Rame, R., Purwanto, P. and Sudarno, S. (2024) Industry 5.0 and sustainability: An overview of emerging trends and challenges for a green future. *Innovation and Green Development*, 3(4), 100173. Available from: <https://doi.org/10.1016/j.igd.2024.100173> [Accessed 18 Aug. 2025].