



26 SEP, 2025

Powering Malaysia's future AI sustainability

The Star, Malaysia



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MALAYSIA'S national ambition to forge a sustainable future through AI and data centre initiatives, markedly reflected in its "AI Nation" framework, now present myriads of opportunities to the country's economic landscape.

Yet, this digital transformation will hike energy consumption to unprecedented levels, exerting substantial pressures on the country's electricity grid and net-zero target.

Balancing growth with sustainability will be Malaysia's defining challenge in shaping its strategic path forward.

AI's energy appetite

By 2030, data centre electricity demand in Malaysia is projected to rise to 12.9 GW—a nearly thirteenfold increase from 1 GW today.

To maintain long-term grid stability, Malaysia has introduced Power Usage Effectiveness (PUE) metrics for new data centres—pushing them to adopt best-in-class technologies to fulfil their respective energy efficiency targets.

However, to uphold sustainable practices across all resource dimensions, Malaysia's policymakers must advance implementation of Water Usage Effectiveness (WUE) and clear-cut green energy consumption targets to mitigate data centres' resource-intensive operations, ensuring minimal impacts on utility provisions to neighbouring communities.

To amend this gap, carefully designed policies centred on comprehensive regulatory frameworks and rigorous enforcement are urgently needed.



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Balancing growth with sustainability commitments

Following Singapore's examples, Malaysia must advance renewable energy procurement as a non-negotiable requirement for data centre approvals and capacity allocations.

This policy lever would serve to ensure that new data centres would not

undermine Malaysia's energy security and decarbonisation trajectory, as outlined in the National Energy Policy 2022–2040.

To translate ambition into action, the Malaysian government must create a de-risked, standardised environment for corporate renewable energy agreements. Streamlined regulations will prove critical in accelerating the development of large-scale solar and wind projects needed to power data centre expansion.

This model has already proven viable, as shown by an existing 22.5 MW solar agreement in Malaysia, demonstrating that such an arrangement could provide feasible solutions to align data centre growth with national energy goals.

As Malaysia's electricity landscape liberalises, operators will find navigating the complexities of energy contracts difficult. Hence, a standardised green tariff, offered by utility players like Tenaga Nasional Berhad (TNB) and endorsed by the Energy Commission's new guidelines, is essential.

Such utility-backed green tariff offers a clear, actionable route for data centres to procure renewable power, further reducing systemic dependence on conventional electricity sources.

Imperative of cross-border energy interconnection

To address long-standing domestic grid constraints, Malaysia must revamp its fossil fuel-dominated energy mix and bring functional cross-border power grids into fruition.

In light of the country's evolving data centre landscape, Malaysia should advance iron-clad partnerships to ensure development of essential interconnector

infrastructure for cross-border power grids, aligning with both domestic diversification efforts for energy sources and the wider Asean Power Grid initiative.

These will be further instrumental toward addressing key public concerns surrounding data centres' energy-intensive operations that could strain the national grid and potentially affect their livelihood, if left unmitigated.

Strategic energy portfolio diversification will additionally accelerate the country's clean energy adoption. Through tapping into regional sources, such as Laos' hydropower and Vietnam's solar ecosystem, Malaysia could leverage green energy sources to grid resilience for Malaysia's growing AI workloads against demand shocks.

Modernising the grid with AI

Ironically, AI itself offers feasible solutions to the grid strains it has helped to fuel.

Malaysia's AI ambition cannot avoid major surges in overall energy appetite. To help accommodate such shifts, grid operators must elevate grid efficiency through scaling up their ability to dynamically predict and balance massive and fluctuating loads from data centres.

In developing smarter grid systems, Malaysia can learn from best practices of real-time energy tracking and AI-driven load forecasting to shift non-urgent computing to off-peak or high-renewable hours. These have long been laid out by leading global players, like Google and Microsoft.

Moving forward, policymakers must synchronise future investments in transmission line upgrades and renewable energy zones to align with any planned locations and projected power needs of new data centre campuses. Malaysia will also stand to benefit from incentivising hyperscalers to enhance their flexible load capacities to aid grid-balancing.

Not only does this shift from reactive to predictive management approach yield substantial prospects of addressing grid instability concerns—they are acutely necessary to prevent costly bottlenecks and ensure sustainability goals are met from the outset.

Leveraging Malaysia's sustainable AI infrastructure

To attract top-tier data centre operators, the country must ramp up key incentive programmes for advanced technologies like fuel cells, battery storage and direct liquid cooling. It must also safeguard investor confidence by ensuring robust implementations of energy and water efficiency standards, as well as requirements for sourcing renewable energy.

These will fortify Malaysia's footing as a forefront destination for sustainable investments, as the country showcases its regional leadership as best-in-class policy architect for digital infrastructure development.

Conclusion

Malaysia's AI-driven growth demands crucial alignment with sustainable energy strategies.

By incentivising clean energy, modernising the grid, and developing more holistic regulatory frameworks, the country can mitigate risks and address key public concerns surrounding energy, while meeting carbon reduction targets.

In the end, Malaysia's choices today will shape its legacy as Asean's leader in sustainable AI infrastructure for decades to come.

The views expressed are entirely the writer's own.