

Powering the Digital Economy: Turning Data Center Growth into Energy Transition Opportunity

Case studies from Thailand & Malaysia

11 June 2026



I. Introduction

II. Impact of data centers of power markets

III. Key takeaways

IV. Appendix

A U R  R A

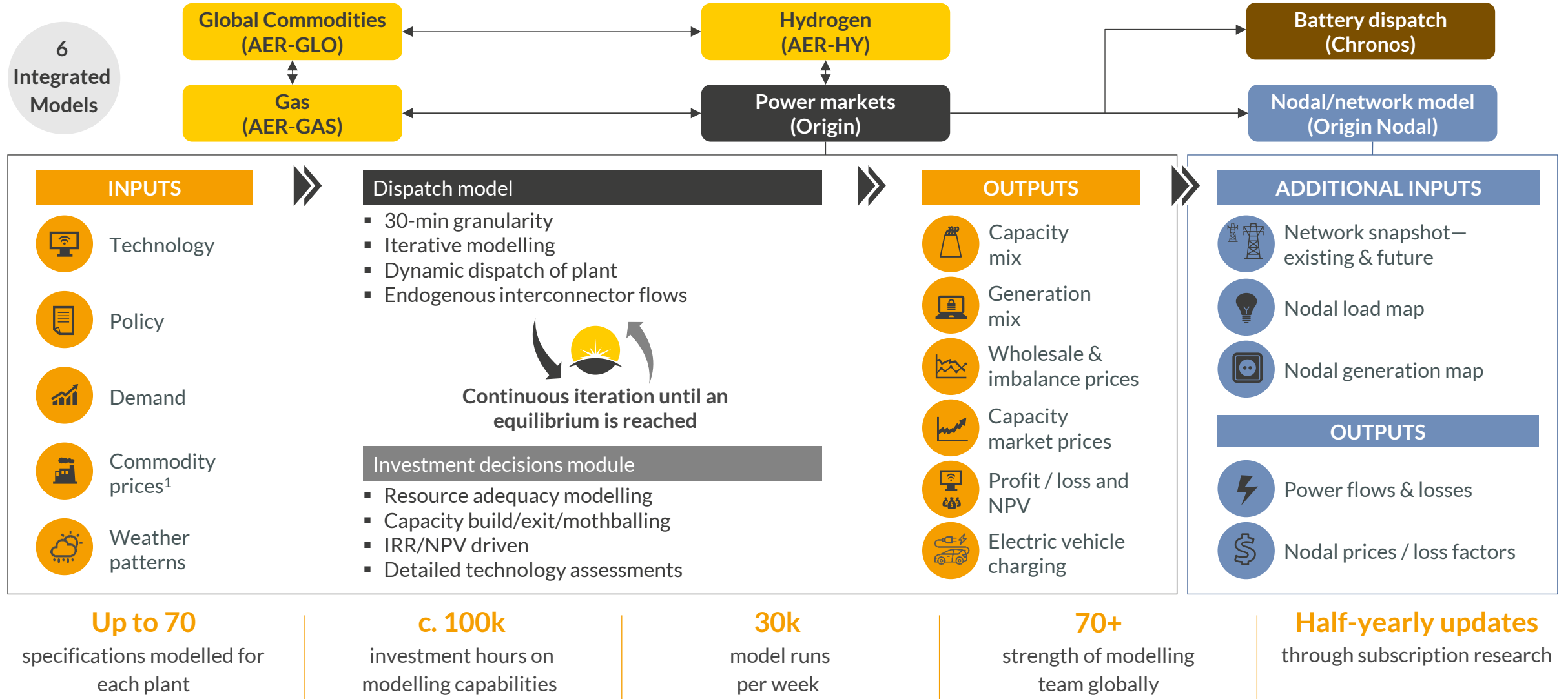
E N E R G Y R E S E A R C H

A global power market and grid analytics firm

More precise valuation with nodal price forecast

>\$45bn USD worth of bankable transactions with Aurora's forecast to-date globally

Unique, proprietary, in-house modelling capabilities underpin Aurora's superior analysis



1) Gas, coal, oil and carbon prices fundamentally modelled in-house with fully integrated commodities and gas market model.

Agenda

I. Introduction

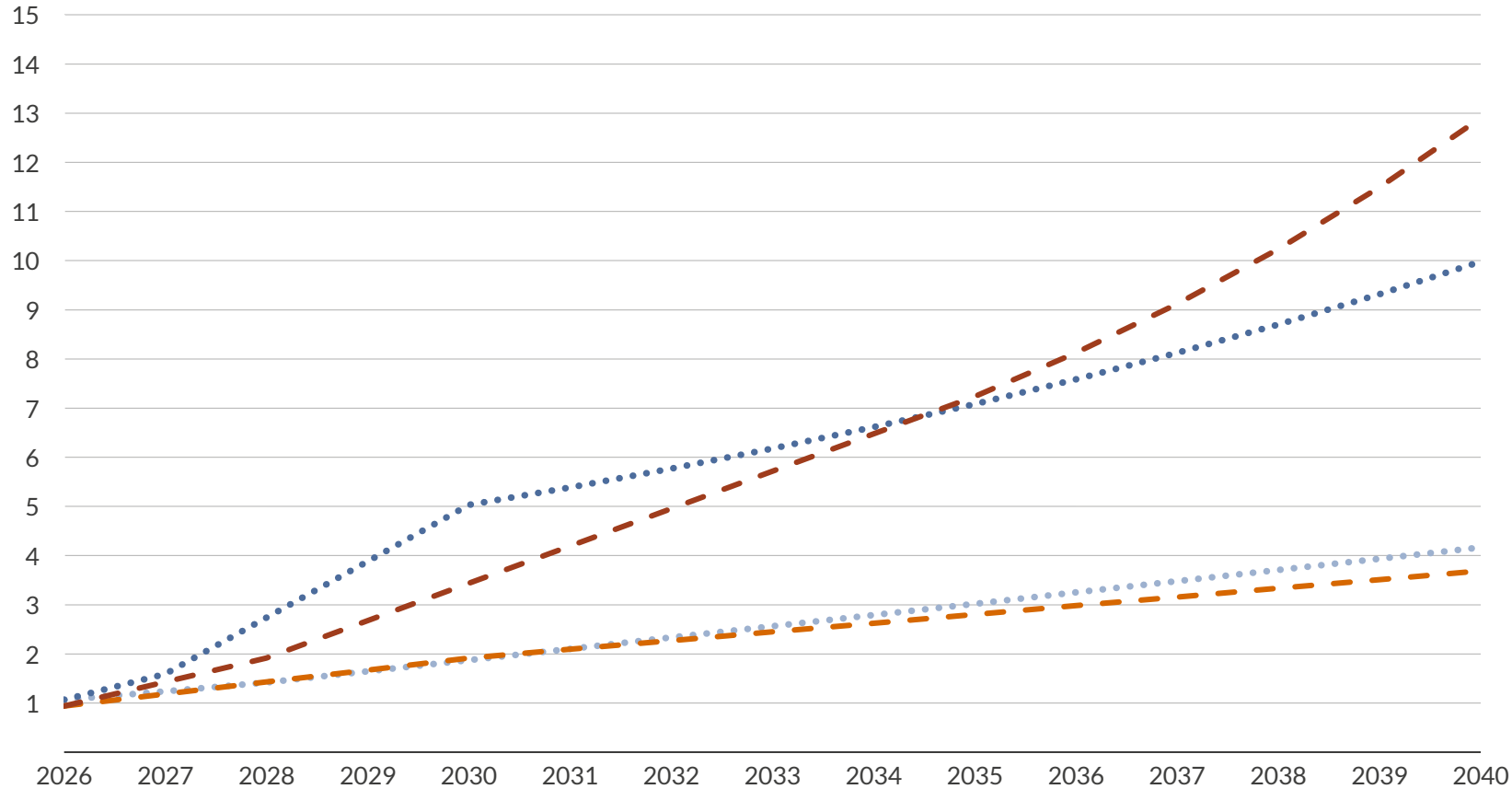
II. Impact of data centers of power markets

III. Key takeaways


IV. Appendix

Modelling scenarios: We modelled accelerating DC demand growth scenarios for Thailand and Malaysia to assess the impact on power markets


Data center power capacity – Base and High DC Demand¹
GW



•••• Thailand - Base DC Demand — — — — Malaysia - Base DC Demand
 •••• Thailand - High DC Demand — — — — Malaysia - High DC Demand

 Thailand – DC demand²

- **Base case** reaches EPPO’s Low Case target of 6.8 GW by 2050
- **High case** reaches EPPO’s High Case target of 19.8 GW by 2050

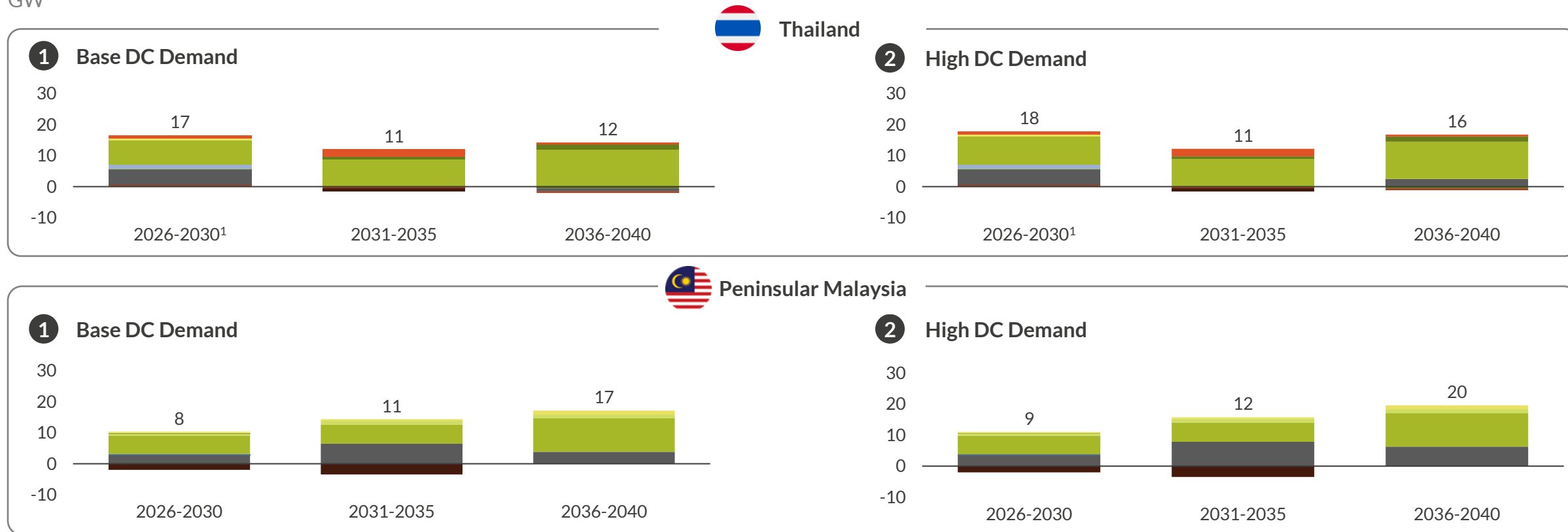
 Malaysia – DC demand³

- **Base case** follows Aurora’s in-house growth trajectory, meeting 5.4 GW by 2050
- **High case** follows PETRA’s target of 12.9 GW by 2040 and 20.9 GW by 2050 but with a 10-year delay

1) Aurora does not consider different types of DCs and their load profiles for this project; 2) Aurora’s DC assumptions for the Thailand scenarios see the system meeting the stipulated High, Low, and Medium case targets by 2050, but assume a slower and gradual growth trajectory in view of on-the-ground observations, and modelled until 2040 for this project; 3) Assumptions for the Malaysian High case is delayed by 10 years to test for a more realistic view of aggressive DC integration.

Insight 1: Solar dominates incremental capacity while gas remains important for firming; higher DC demand drives significant capacity additions

Cumulative net capacity additions, including capacity retirements, per 5-year period
GW



- Capacity additions over time in both Thailand and Peninsular Malaysia are driven heavily by **utility-scale solar**, with both countries anticipating a significant increase in renewables buildout.
- While Thailand's **strong existing supply margin** means that gas **capacity additions¹** are **relatively lower**, Peninsular Malaysia sees **strong buildout (~6-9GW)** in the **early 2030s** to replace outgoing coal.
- Both countries see **stronger dependence on gas capacity in the High DC Demand scenario**, highlighting that **gas is a crucial baseload technology** to support increased 24/7 demand from DCs.

Imports Battery storage Pumped storage Solar (utility-scale) Rooftop solar Onshore wind Biofuels Hydro Diesel Gas Lignite Coal

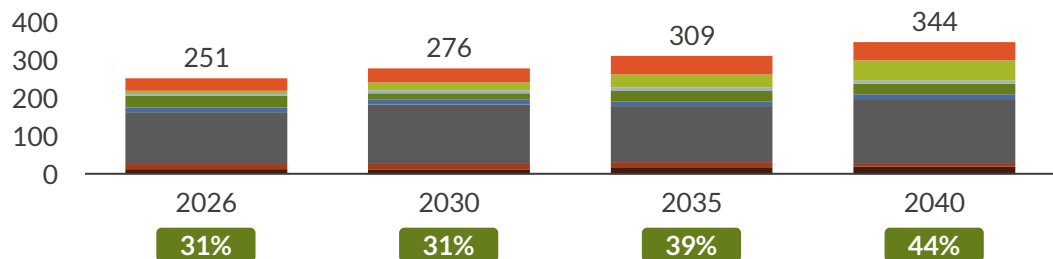
1) Includes the ~4GW of gas capacity that is currently suspended until September 2029, and is anticipated to resume operations.

Insight 2: Renewables share increases, particularly solar, but gas remains as the marginal technology; higher DC demand is met by gas generation

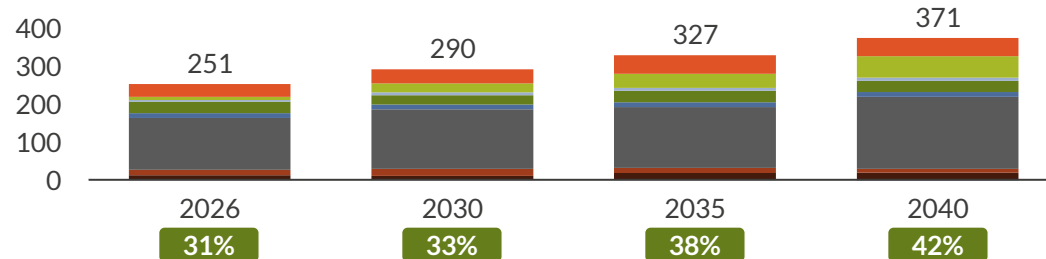
Generation mix
TWh



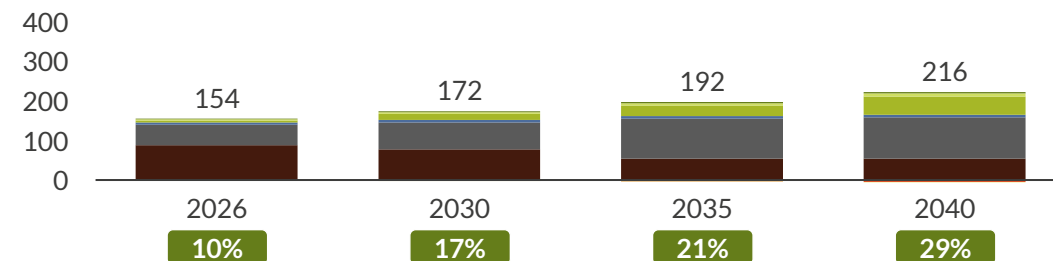
1 Base DC Demand



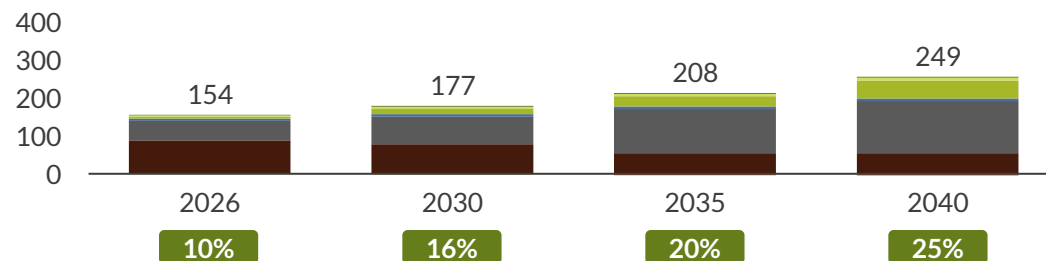
2 High DC Demand



1 Base DC Demand



2 High DC Demand



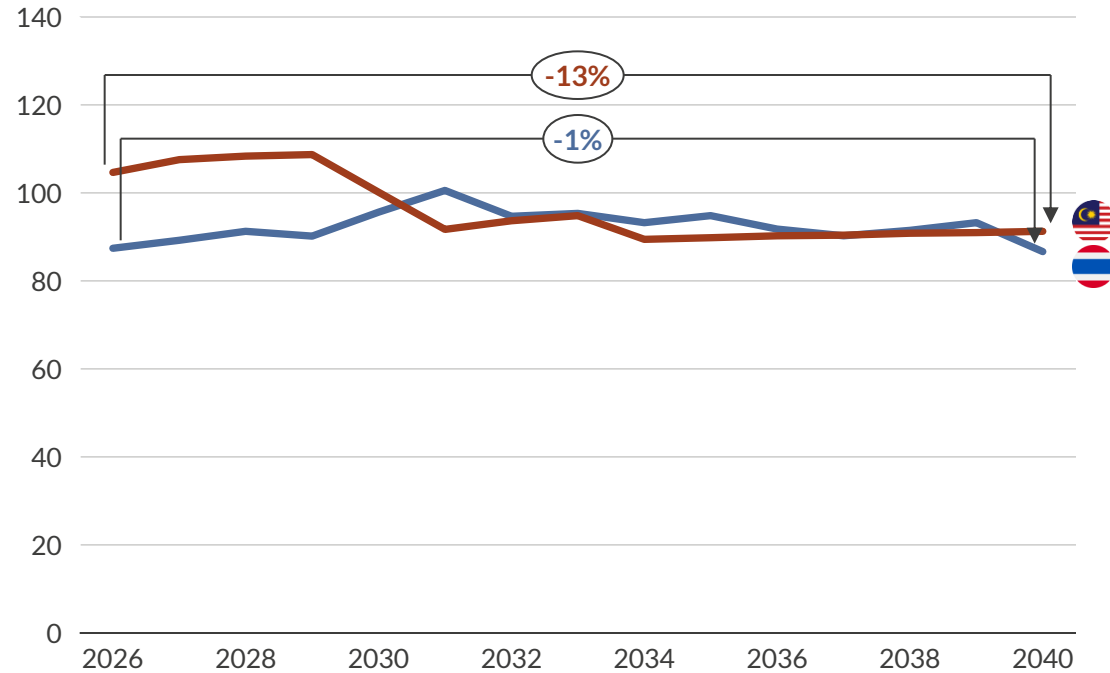
- Despite increasing integration of renewables in both countries, thermal generation still dominates the supply mix of both countries by 2040 (~56-58% in Thailand; ~71-75% in Malaysia).
- Thailand sees a **major contribution from solar and imported hydro from Laos** towards its renewables targets by 2040, but **any incremental DC demand will result in increasing reliance on gas.**
- Peninsular Malaysia is slated to remain **heavily dominated by thermal by 2040**, with **gas-fired generation becoming the dominant source over coal by 2040**, accounting for **47-55% of generation.**

Imports Battery storage Pumped storage Solar (utility-scale) Rooftop solar Onshore wind Biofuels Hydro Diesel Gas Lignite Coal % RE³

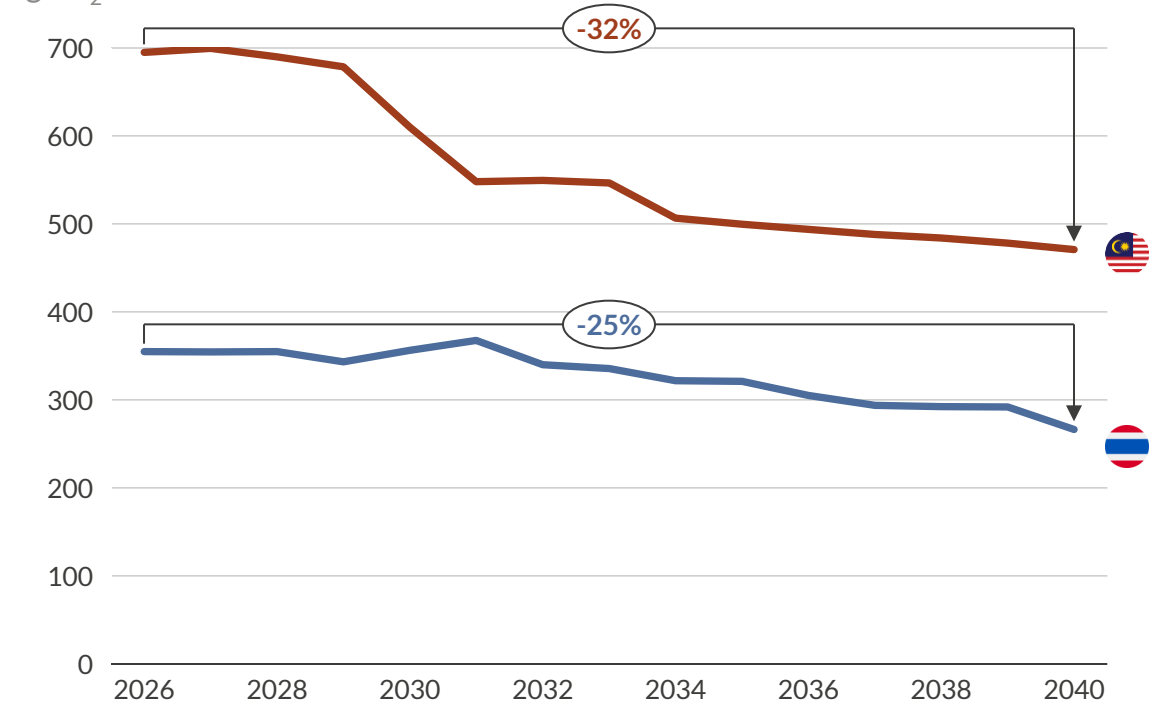
2) RE generation refers to generation from solar, onshore wind, biofuels, and hydro, and includes hydro imports for Thailand.

Insight 3: Thai emissions remain similar due to gas reliance while Malaysia switches away from coal; carbon intensity declines meaningfully with more RE

Total power system emissions
MtCO₂e



CO₂ equivalent intensity
gCO₂e/kWh¹



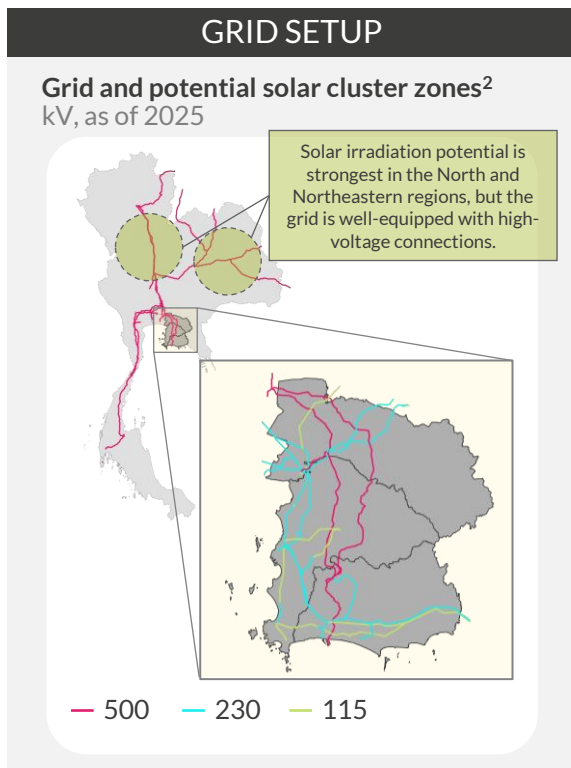
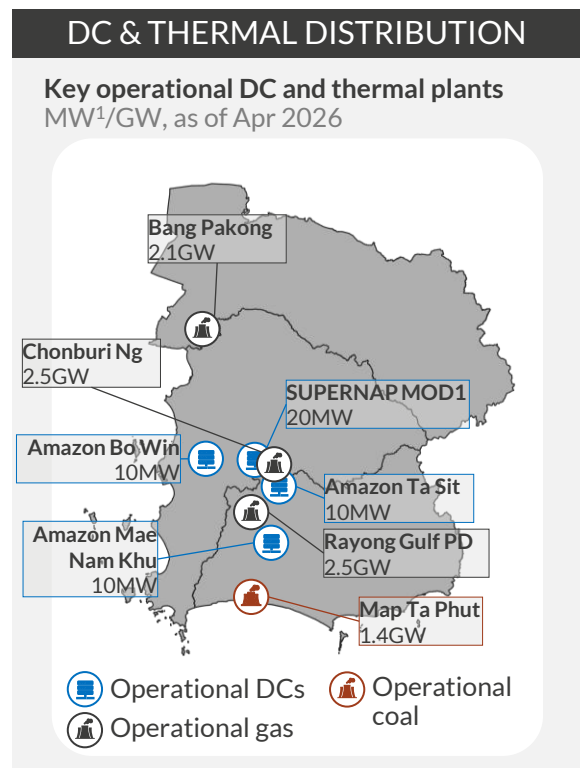
- Overall system emissions in Thailand **decline slightly (~1% by 2040)** as **gas still remains a crucial element of the power system**, particularly with increasing data center demand over time.
- Malaysia, however, sees a reduction in total emissions due to its **coal-to-gas transition**, resulting in a **much more substantial reduction by 2040 (~13%)**.
- Both countries see a meaningful reduction in CO₂-equivalent intensity because of an **increasing proportion of renewables** within their supply mix, **comprised primarily of solar by 2040**.

— Thailand — Malaysia

1) CO₂ intensity calculated as total electricity sector emissions divided by the total electricity generation by region.

Insight 4A: While the EEC can theoretically handle a DC boom, system planning and pre-emptive grid upgrades are necessary to mitigate any negative impacts

Thailand – Key consideration factors for DC integration in the EEC and known policy reactions

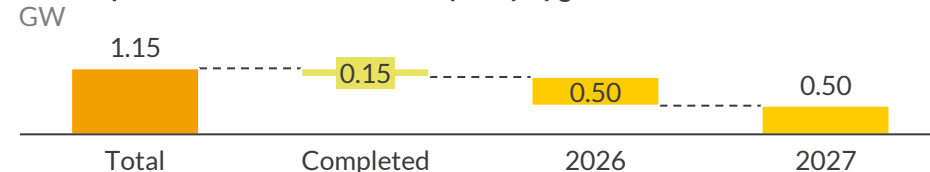


in response;

Pre-emptive system planning

- EGAT has put ~THB 31bn (~US\$ 1bn) to upgrade the EEC grid by ~1.15GW between 2026-2027.

EGAT's planned EEC transmission capacity upgrades



- The government also allocated ~3bn THB (~0.1bn USD) to upgrade the grid outside of the EEC as part of the “Quick Big Win” policy.

Incentives for future DC relocation out of EEC

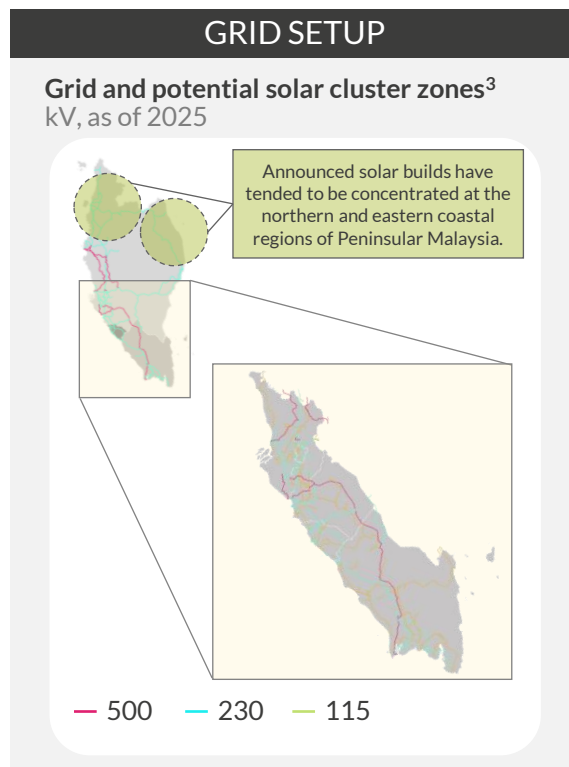
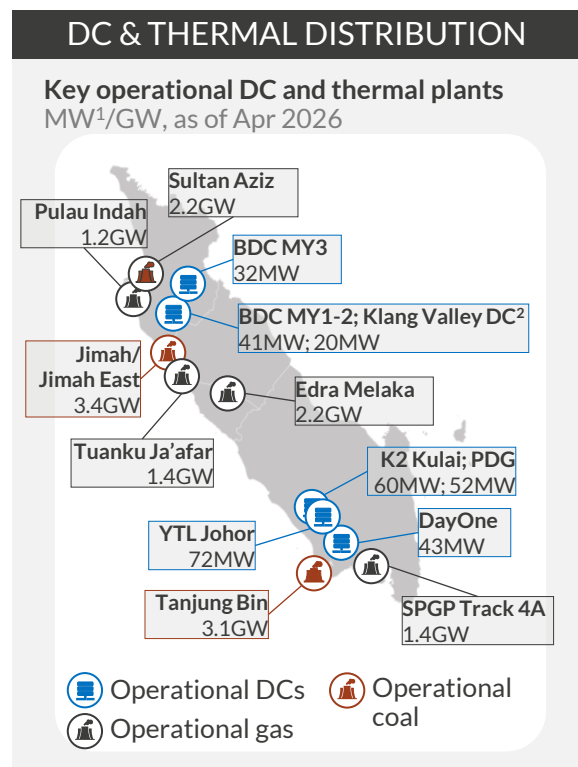
- Future DCs outside the EEC can already avail of up to 8 years of corporate income tax exemptions from the BOI; EEC DCs can only avail of up to 5 years.

- The EEC grid is strong and well-connected to other parts of Thailand; proximity to thermal generation also bodes well for future DC integration.
- Still, anticipating potential grid stress in EEC brought about by the AI and hyperscale boom, the government has pre-emptively sought to upgrade the national grid and encourage DCs to relocate outside the EEC through financial incentives.
- Yet, with few known such projects currently, other potential measures (i.e., differential energy charges, lower wheeling charges for PPAs, etc.), could be necessary to further incentivise developers.

1) Refers to power capacity and not IT capacity; 2) Based on solar irradiation profiles and known project announcements.

Insight 4B: DC load is highly concentrated in Johor – Cyberjaya – Kuala Lumpur, and grid constraints are emerging as a binding issue

Peninsular Malaysia – Key consideration factors for DC integration in Johor-Cyberjaya-Kuala Lumpur and known policy reactions



in response;

Active investments into grid modernisation

- In line with its “Grid of the Future” strategy, TNB is investing ~RM 43 bn (~US\$ 10.8 bn) to modernise its grid to cater to the forecasted boom in data center demand.
- Future grid investments are concentrated around pre-identified growth clusters, with Johor as a key active cluster, given its future DC demand projections.

Expedited process for DC grid connections

- TNB’s “Green Lane Pathway” framework reduces grid connection timelines for DCs from 36 to 12 months; as of Mar 2026, 33 projects have been delivered under this framework.

- Malaysia’s current and anticipated DC loads are concentrated in Johor, Cyberjaya, and Kuala Lumpur, close in proximity to the largest thermal plants in the peninsula.
- However, existing solar projects have tended to cluster at the northern and eastern regions where the network is weaker and less developed, highlighting a potential geographical disjoint between solar buildout and heavy load growth.
- Therefore, heavy investment into the grid will be required – through modernisation and flexibility – to ensure that future renewable capacity growth can support the anticipated boom in DC demand.

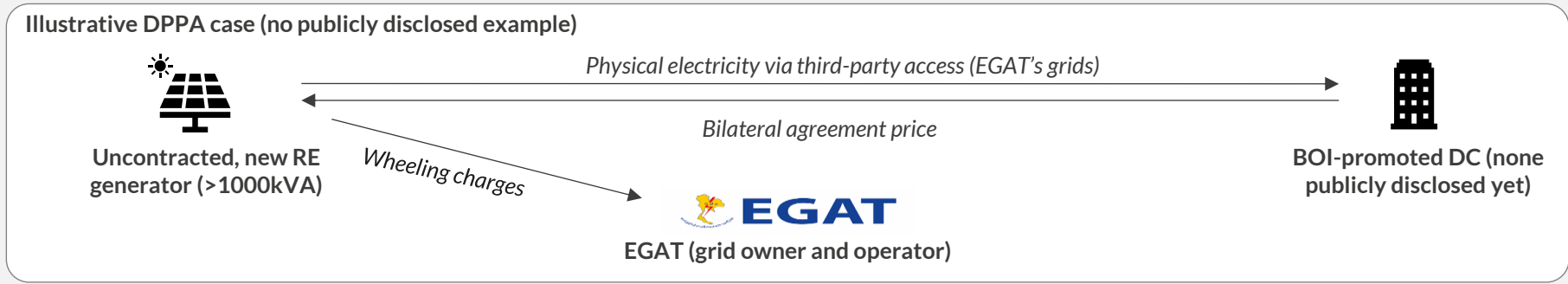
1) Refers to power capacity and not IT capacity; 2) Non-exhaustive list of DCs in Cyberjaya; known operating capacity stands at ~170MW as of April 2026; 3) Based on solar irradiation profiles and known project announcements.

Insight 5A: Direct access to green power will be a key enabler for DC growth, with regulatory clarity and policy support required

Thailand



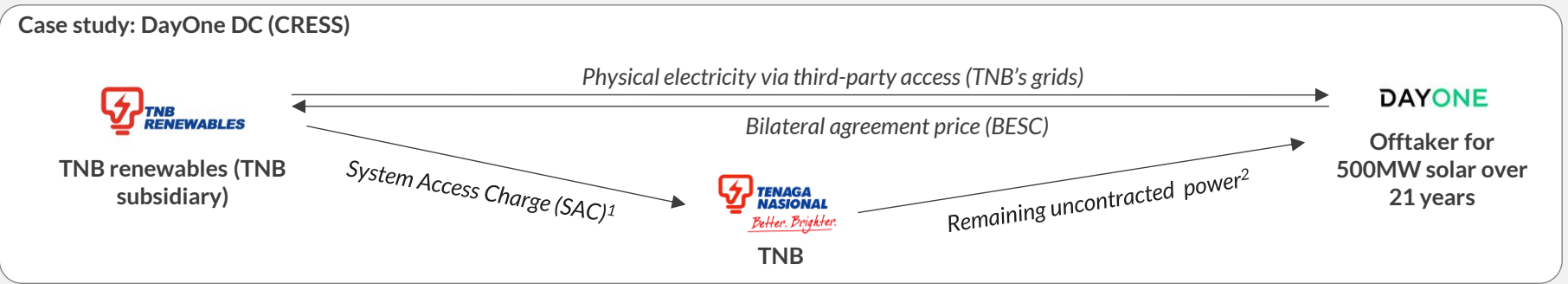
Thailand's 2 GW direct PPA pilot for BOI-promoted DCs (≥ 50 MW per building, with a 10-year proposed DPPA plan, 100% RE usage) was approved under NEPC in 2024, and is the first departure from its enhanced single-buyer model. Nevertheless, this scheme faces high regulatory risk as the TPA code remains in its draft stages, and no deals under the pilot have yet been announced.



Peninsular Malaysia



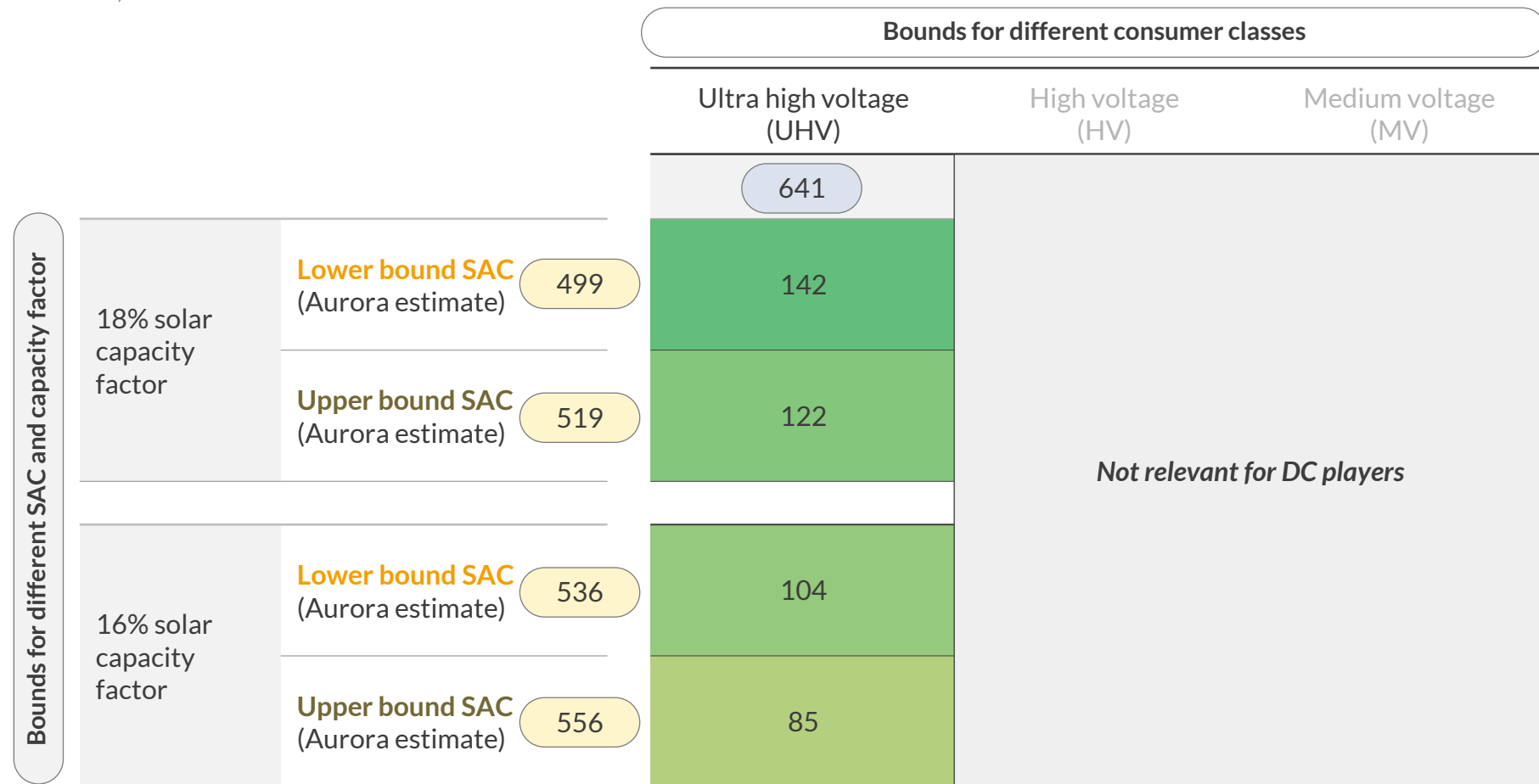
Malaysia's solar corporate PPAs total ~5.1 GW as of 2025 (~0.8 GW CGPP and ~4.3 GW CRESS), but most capacity remains planned or announced rather than operational.



1) SAC is 200 RM/MWh (~45USD/MWh) for firm and 400 RM/MWh (~90USD/MWh) for non-firm energy. Firm energy refers to intermittent renewables paired with BESS $\geq 50\%$ of registered capacity, capable of dispatching that capacity continuously for 4 hours, while non-firm energy refers to intermittent renewables without BESS; 2) DayOne will remain a TNB customer and draw any uncontracted power requirements from the TNB grid at prevailing regulated tariffs;

Insight 5B: CRESS offers attractive opportunities for DCs for Malaysia, but faces high levels of uncertainty due to SAC

Indicative zone of possible agreement¹ for multiple SAC and solar capacity factor set-ups in 2028 – Base DC Demand case
RM/MWh, real 2025



- UHV consumers see a **healthy range of CRESS negotiation possibilities**, primarily driven by the high alternative cost of procuring energy from the utility.
- SAC is a key factor in price formation.
 - **Upper bound SAC** shows a ~10% decrease of the possible agreement zone compared to **Lower bound SAC** of Aurora estimate.
- The numbers shown are based on a **PPA duration of 21 years**.
 - If the PPA extends beyond 21 years, either through an extension or on the merchant market could expand zone of possible agreement.
- The numbers shown assume a **WACC of 9.5%** (real, pre-tax).
 - If the developer secures a lower cost of capital, the zone of possible agreement could expand.

Delta between developer willingness to accept and consumer willingness to pay; green indicates larger range of possible agreement zone
 Developer minimum WTA² Offtaker maximum WTP²

1) Assuming solar CAPEX of ~2.4m RM/MW (real 2025) and 4-hr BESS CAPEX of ~4.7m RM/MW (real 2025) in 2027 with additional cost-saving advantage from economies of scale; 2) WTA = willingness to accept; WTP = willingness to pay.

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Modelling results provide key insights on the potential impact of DCs and how they can further the energy transition



Thailand

1 DCs become a system-defining load

- DC demand is expected to scale from **~1GW** today to **4-10 GW by 2040**, reaching **6-12%** of national demand.
- >80% of capacity will be concentrated in **Metropolitan and EEC regions**, creating localized system pressure.

2 Significant capacity additions are required

- System will need to grow from **~63 GW to >100 GW** by 2040, but a strong existing supply margin allows for the **gradual build out** of firm capacity.

3 Solar dominates, but gas remains critical

- Solar drives most new capacity (**~34-41 GW by 2040**), but incremental DC demand is still met by gas (**~1-7 GW of additional capacity required**)¹ due to the need for dispatchable power.

4 Emissions reductions take time to be realized

- Total emissions increase in the near-term, and **net zero is not met** across any modelled scenarios. However, **carbon intensity declines** over the years due to increasing renewables generation.



Peninsular Malaysia

- DC demand is expected to scale from **~0.9 GW** today to **4-13 GW by 2040**, reaching **6-19%** of national demand.
- >90% of capacity will be concentrated in **Johor and Selangor**, creating localized system pressure.

- Total capacity will need to double to **~71-76 GW** by 2040, with gas as the dominant marginal technology as coal is retired and solar reaches build limits early.

- Solar drives most new capacity (**~22-29 GW by 2040**),
- However, especially due to the retirement of coal-fired assets, gas still remains crucial (**~5-11 GW of additional capacity required**)¹.

- Total emissions increase in the near-term, and **net zero is not met** across any modelled scenarios. However, **carbon intensity declines** over the years due to increasing renewables generation.

1) While higher commodity price scenarios (i.e., Scenario B) have lesser additional gas capacity requirements due to poorer economics for gas assets, gas still remains a critical element of the generation mix to ensure overall system stability with the influx of 24/7 baseload demand from DCs.

System planners must proactively align grid, capacity, and policy to enable data center growth sustainably

Key considerations for system planners



Integrate DC load into national power system planning

- Incorporate **DC demand scenarios as a primary input into future power plans** (e.g., updated PDP for Thailand, future revisions of Malaysia's national capacity plan).
- Using **zoning, incentives, or connection policies** to spread load beyond constrained hubs.



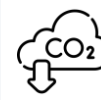
Align grid investments with DC capacity growth

- Grid upgrades should be **scaled in line with DC load** (e.g., 1.5GW of additional transmission capacity vs. ~4GW of projected DC capacity in EEC).
- Map **DC growth zones against RE generation sites** and invest in inter-regional transmission to reduce costly wheeling bottlenecks.



Ensure sufficient dispatchable and firm capacity

- Plan for **dispatchable generation** (e.g., gas CCGTs) and / or **storage** to complement renewables growth and meet DCs' need for firm power.



Establish a transparent cost and emissions trajectory

- **Anticipate affordability impacts** and provide clarity on system cost charges across consumer classes.
- Actively incentivize renewables and storage (~2 – 2.2 GW of renewables installation needed per year) to avoid relying on gas to meet reliability needs.



Operationalize and de-risk PPAs to increase investor confidence

- **Thailand:** DPPA framework needs to be sufficiently clear and verifiable to unlock private procurement and provide DCs a pathway to avoid overloading the grid.
- **Malaysia:** Publish clear, stable tariff trajectories to ease concerns around and tariff increase, which can unlock private procurement and reduce pressure on grid.

1) While higher commodity price scenarios (i.e., Scenario B) have lesser additional gas capacity requirements due to poorer economics for gas assets, gas still remains a critical element of the generation mix to ensure overall system stability with the influx of 24/7 baseload demand from DCs.

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- II. Impact of data centers of power markets
- III. Key takeaways
- IV. Appendix

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