

EXPOSURE DRAFT

RATING METHODOLOGY

MARC

DATA CENTRES

INTRODUCTION

The growth of data centers has accelerated in recent years following the rapid growth of cloud technologies, machine learning applications as well as artificial intelligence capabilities. Defined as a dedicated space or building that houses computer systems, storage, telecommunications systems and other components in a highly secure environment, data centers provide shared access to a wide range of applications and data¹.

The US is by far the largest player in the global data markets, with around half (14.8GW) of total capacity. The data center industry in the Asia-Pacific (APAC) region accounted for a third of global capacity at around 10.5GW. This is forecast to grow at a compound annual average rate of almost 20% through 2028, led by regional powerhouses China, India and Australia².

In Southeast Asia, Malaysia has emerged as among the top destinations for data center investments in Southeast Asia. Among its states, Johor has benefited from the spillover from Singapore which has already attracted more than 1,000MW capacity from 100 data centers.

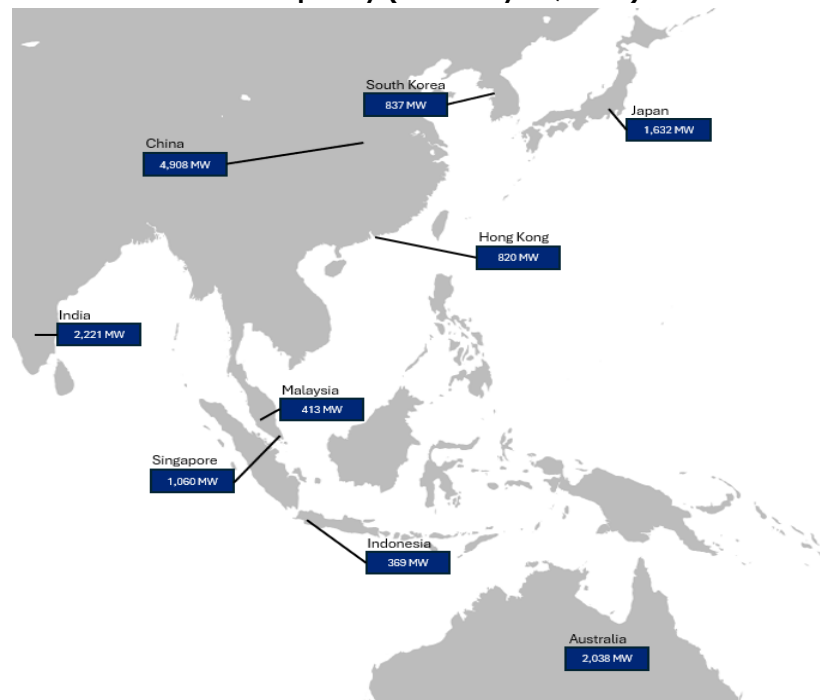
Contact:

Neo Xue Wei
Senior Analyst
xuewei@marc.com.my

Farhan Darham
Assistant Vice President
farhan@marc.com.my

Yazmin Abdul Aziz
Rating Portfolio Head – Structured
Finance, Property & Retail
yazmin@marc.com.my

+603 2717 2900
www.marc.com.my

APAC Data Center Capacity (as at July 24, 2024)

Source: MARC Ratings, Moody's Ratings

Malaysian Government initiatives drive data center development

The Malaysian government has been proactive in setting policies to attract investments in the industry. According to Ministry of Investment, Trade and Industry, Malaysia has approved RM123.5 billion in data center investments since 2021 and are expected to create more than 64,000 high-value jobs.

Summary of proposals as follows:

Ministry	Policy proposals
Digital	<ul style="list-style-type: none"> Establishment of Malaysian Data Commission to develop adequate frameworks and policies, by amending the Personal Data Protection Act 2010.
Energy Transition and Water Transformation	<ul style="list-style-type: none"> Launch of the Corporate Renewable Energy Supply Scheme (CRESS) in September 2024, giving data centers direct access to electricity supply from third-party renewable energy producers.
Investment, Trade and Industry (MITI)	<ul style="list-style-type: none"> Preparation of new guidelines for data center power usage effectiveness (PUE) and water usage effectiveness (WUE). Currently, domestic PUE minimum requirement from 2015 is 1.9, with 1.6 considered excellent (1 is best, and equivalent to no wastage of power (for country comparison please refer to Appendix)
Housing and Local Government (KPKT)	<p>Published guidelines for data center planning (This document can be accessed through https://shorturl.at/8T1Gj).</p> <p>Summary of key details as follows:</p> <p>Data Center categorization</p> <ul style="list-style-type: none"> Small (1-5MVA, 11kV) Simple (>5-25MVA, 33kV) Big (>25MVA, 132kV, 275kV)

	<p><u>Electricity supply key requirements</u></p> <ul style="list-style-type: none"> • Main intake substation is required in line with the capacities above. ▪ All developments must consider industry standard PUE (TBC). ▪ Standby generators with sufficient capacity must be available. <p><u>Water supply key requirements</u></p> <ul style="list-style-type: none"> • Water-saving and renewable water technologies (direct expansion & eco-chiller water systems) should be used. ▪ All developments must consider industry standard WUE (TBC). <p><u>Telecommunications key requirements</u></p> <ul style="list-style-type: none"> • Each data center must have at least 2 service providers. • Minimum internet speed access – 300mbps.
--	--

Note: Policies to be updated further

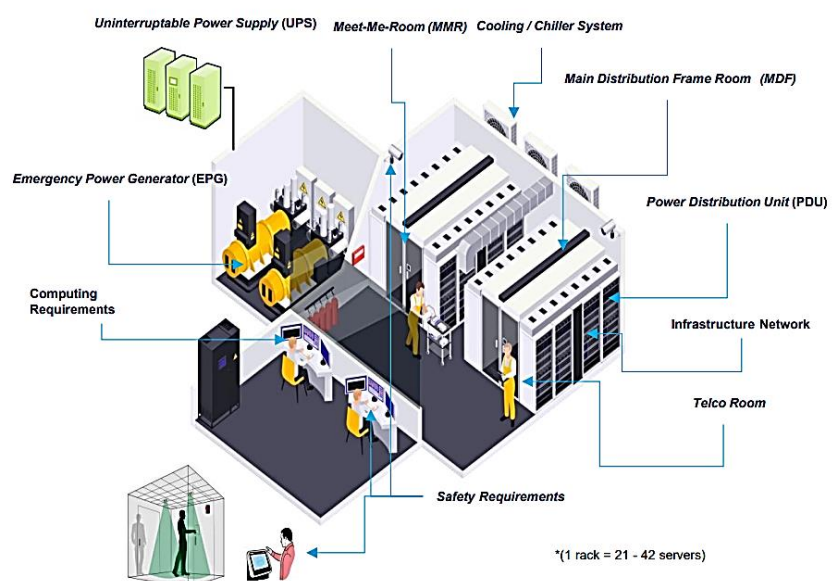
Key economic sectors benefit from data center growth

The growth in data center development is expected to provide opportunities across the value chain and benefit other economic sectors as well. These include **telecommunications**, **utilities** as well as **property** and **construction** sectors. Telco companies in particular would be able to increase their revenue streams from core businesses by leveraging on existing connectivity infrastructure. Property and construction companies with large landbank that are located at prime areas would directly benefit from the data center developments. Property companies can also monetise data center facilities as recurring income streams.

DATA CENTERS

A typical data center will have a similar layout³ as below:

Data Center Layout



Source: KPKT

Core components are the computing needs, including desktops, servers and racks. These are connected by an infrastructure network (cables, switches, routers etc.) to the user. Supporting components include power supply equipment (generators, PDU etc.), a cooling system, security system and telco operation room. Data centers may also have dedicated substations allowing power supply from the grid to be interconnected as a power source.

Hyperscale data center

Hyperscale data centers are massive facilities that provide extreme scalability capabilities and is engineered for large-scale workloads with an optimized network infrastructure, streamlined network connectivity, and minimized latency⁴. These facilities consume a significant amount of energy, ranging from 40 megawatts (MW) up to 300 MW (with a few exceptions, such as the Citadel Campus in Reno that runs on 650MW). Hyperscale data centers are specifically built to meet demands from one or a few large companies, and are sometimes owned and operated by the companies themselves.

Leasing contracts for hyperscale centers are generally for lengthy periods of 5 years or longer. This is due to the large capital requirements for the facilities, given their scale and numerous *redundancy* features such as back-up power systems, reinforced power lines to handle electrical loads, as well as efficient cooling equipment with dedicated water lines and piping.

Colocation data center

Colocation or retail data centers are relatively smaller in scale (typically below 10,000 sq. ft) and consist of a third-party operator or owner leasing space, power and cooling services to multiple tenants. Under this arrangement, tenants co-locate their IT equipment and lease space depending on their needs.

Colocation centers allow tenants to avoid high capital costs associated with setting up their own data centers. Leasing contracts are normally shorter in nature compared to hyperscale (less than 5-years) and entail the payment of a base rental rate plus the cost of utilities usage. The infrastructure (space, connectivity, power supply, cooling system) will be maintained by the colocation operator/owner.

Enterprise data center

Enterprise data centers are customized, private facilities that are owned and operated by an individual organisation to meet its own specific data processing and storage needs. They offer the organisation greater control over the infrastructure, allowing it to install proprietary hardware or applications. This data center also allows companies to continue running legacy systems that may not be supported elsewhere.

This type can be built on-premises or off-premises. On-premises data center gives an enterprise direct access to its servers and more control overall. However, some organisations build off-premises data centers based on connectivity, reliability and accessibility to end-users.

Containerised/Modular data center

Containerised or modular data centers are the smallest version of data centers and can be set up in trailers or freight containers. These are typically used by companies that require rapid and temporary upscaling of IT capacity; a fully functioning containerized data center complete with computing capabilities, power supply and cooling system can be constructed in as short as 90 days. This type of data center is portable and can be located on construction sites or in disaster areas.

Modular data center by Microsoft Inc.



Source: The Verge

RATING APPROACHES ON DATA CENTERS

There have been several methods established to evaluate the credit strength of a prospective data center developer/operator, listed as follows:

	Example 1	Example 2	Example 3
Methodology	Project finance	Asset-backed securities (ABS)	Real estate investment trust (REIT)
Issuer	SPV	SPV	REIT
Asset/Collateral	Land	Operating data center	Pool of data center assets
Construction risk	Yes	No	No/Limited

As the Malaysian domestic data center industry is in a relatively nascent stage of growth, with a substantial proportion of projects are currently under construction and are therefore likely use the project financing approach. MARC Ratings expects the growth of data centers domestically would focus on hyperscale and accordingly the financing requirements would be fairly large.

Transactions that have unmitigated construction risk will be analysed in line with the rating agency's existing Project Finance criteria. For transactions involving the securitisation or pooling of operational data center leases, these could be

analysed in accordance with asset-backed securities (ABS) or real estate investment trusts (REIT) methodology as in Example 2 and Example 3.

PROJECT FINANCE

The rating considerations articulated in this methodology focuses on pre-operational data center risks. Key areas in our assessment are:

- Project Sponsor
- Market Risk/Offtaker Risk
- Operational and Construction Risk
- Financial Risk
- Issue Structure Risk

Project Sponsor

MARC Ratings will assess the sponsor's track record and experience in construction and operations. Its level of financial commitment to the project will also be considered; a higher level of equity investment, provision of liquidity support and/or maintenance of material interest in the project throughout the tenure of the rated facility will be positive to the rating. A highly rated sponsor with a demonstrated track record of providing ongoing financial support for its projects is viewed as a credit strength.

MARC Ratings will also consider supportive factors such as the perceived benefits to its existing business, exit clauses and change in control covenants under the project financing documents.

Market Risk

Lessees

The credit strength of the lessee (s) will be assessed in terms of the ability and willingness of the lessee(s) to pay its obligations. In the case of several lessees, MARC Ratings will determine the weighted average credit strength of the offtakers. Given the industry's crucial role, the rating agency views that data center projects are likely to demonstrate a higher ability to replace lessees, particularly for colocation centers. In the case of hyperscalers, if there are unexpected replacements during the construction period, MARC Ratings would reassess the credit strength of the potential replacements.

The rating agency will also assess the key terms of the tenancy contracts, such as the length, payment terms, and performance requirements. The rating agency would also view contracts that are triple-net lease more favorably.

Operational Risk

We consider the degree of operational risk for data centers as higher towards complex facilities as opposed to relatively simpler facilities (schools and hotels). MARC Ratings will also assess project-specific attributes:

- Technology
- Electricity and water supply

- Operations and maintenance agreements
- Warranty and support availability

The rating agency may require comprehensive risk assessment reports by an independent consultant engineer (ICE).

Technology

Data centers require high levels of reliability/uptime (mission-critical centers require close to 100%). The supporting infrastructure is usually designed to maximize this, and consists of redundant power to ensure power outages do not affect operations; cooling systems to prevent system failure from heat generated by the core equipment; fire suppression; and building security.

The technological capabilities of a data center can be tiered in accordance with its reliability and redundancies as follows:

Tier	Redundancy	Uptime	Downtime
I	Not available	99.671% per year	Maximum of 28.8 hours of annual downtime
II	Some cooling and power redundancies	99.741% per year	Maximum of 22 hours of annual downtime
III	N+1 redundancy	99.982% per year	Maximum of 1.6 hours of annual downtime
IV	2N/2N+1 fault redundancy, no single points of failure	99.995% per year	Maximum of 26.3 minutes of annual downtime

Source: Uptime Institute classification system in 2005 (<https://uptimeinstitute.com/tiers>)

Higher tiered data centers (Tier 4 being the strongest) have more in-built redundancy and higher annual uptime, making them more efficient operationally as compared to lower tiered data centers.

New centers would also typically have a competitive edge over older facilities as older data centers are not built to accommodate the need for higher power and minimal uninterrupted operations.

Electricity and water supply

Data centers are complex environments housing various IT equipment that require high levels of electricity to run. This would also generate high levels of heat, which needs to be managed through cooling systems to maintain an optimum temperature for the data center (typically between 21°C and 24°C). Water cooling plays a significant impact on a data center's PUE; it is more efficient than air cooling due to better heat conduction and can lower a data center's power usage by around 20%. Emergency water tanks are also important to ensure the continuity of cooling performance.

The rating agency will assess the sufficiency and reliability of electricity and water supplies. Ideally, supply risks should be mitigated by a long-term supply agreement(s) with the supplier(s). Access to alternative suppliers would also be considered.

Operations and Maintenance/Security

Data centers require regular maintenance to ensure uninterrupted services and prevent costly outages. Support staff are also required to be on duty to monitor operations and quickly address periodic disruptions in service.

Operations and maintenance agreements should therefore cover the required performance standards for the data center and have in place the necessary performance guarantees as well as terms for the associated liquidated damages in the event of underperformance. The agreement should also be verified by an ICE report.

Positive rating drivers include having an experienced operator with lengthy track record in the same data center technology and/or geographical area with adequate resources and qualified staff.

Construction Risk

The major construction risks are delays in completion of the project, budget overruns and sub-optimal performance standards.

Contractors

MARC Ratings will review the strength and quality of the contractor for the timely completion of the project and ability to meet performance requirements to achieve commercial operation. In this respect, MARC Ratings will assess the contractor's track record, technical and financial capability, and direct experience in projects with similar technology and scale in conjunction with the opinion of the ICE. A financially strong and reputable engineering, procurement and construction (EPC) contractor along with any enhancements such as letters of credit, performance guarantees or other forms of performance security are viewed positively.

Contract Terms

A fixed price, turnkey contract with liquidated damages (LD) for completion delays from a financially strong contractor with an established track record will reduce budget overruns and completion risks. MARC Ratings will review the terms in each phase of the construction through to commissioning and production start-up. The rating agency will assess the reasonableness of key construction milestones, including sufficient buffer for delays, and assess the contract terms for adequacy of LD.

Manufacturers and major suppliers

MARC Ratings will consider the manufacturers' level of experience with the data center technology, their creditworthiness, and reliability for timely delivery. The rating agency will also review the manufacturers' warranty claim experience as a reference for ascertaining equipment quality. If there is a risk of a manufacturer being replaced, an assessment will be made on how quickly and cost effectively the equipment can be delivered alternatively and whether the project has the financial resources to support a change in manufacturer.

Financial Risk

The primary financial metric for pre-operational data centers is the finance service coverage ratio (FSCR), which is a measure of the project's cash flow resiliency and debt repayment capacity under rating case and sensitised scenarios. Analysis on the cash flow will be focused on the projected cash-generating ability of the project and the robustness of cash flows under adverse scenarios to meet the debt obligations.

Assessment	Average FSCR	Indicative Rating Band
Strong coverage	≥ 1.50	$\geq AA$
Sufficient coverage	1.25-1.49	A
Moderate coverage	1.00-1.24	<A
Weak coverage	<1.00	Non-investment grade

MARC Ratings will stress test the cash flows, which will include changes in interest and exchange rates, operating costs, cost overruns and delays in completion and commencement. Cash flow predictability is also a key consideration; this is determined by the level of performance requirements as well as the credit quality of offtaker(s).

MARC Ratings will also look at broader measures of capitalisation instead of solely focusing on gearing levels; debt leverage is assessed in relation to project-level business, regulatory and financing risks.

For a more thorough analytical framework on the project's financial risk analysis, please refer to MARC Ratings' Project Finance rating methodology.

Issue Structure Risk

The details of the issue structure spell out the principal terms, conditions and covenants of the debt facility, such as repayment, security, and designated accounts. Terms, conditions and covenants under the issue structure should be directed towards ensuring the solvency of the project and the adequate management of project cash flows by the project sponsor in order to service its debt obligations.

Credit Enhancements

To strengthen a project's issue structure, issuers may elect to adopt an array of credit enhancements. Lenders are traditionally protected by a debt reserve requirement, usually set aside in a finance service reserve account, as well as a payment waterfall structure that prioritises debt payments/repayments and the continuity of project operations. These enhancements will be factored into the rating, with a particularly strong set of enhancements potentially resulting in an upward adjustment of the rating, while material omissions could cause downward adjustments instead.

Refinancing/Renewal risk

In the event of a partially/non-amortising sukuk structure, refinancing risk becomes a key consideration for the project as the amount of debt required to

be refinanced at maturity date can be substantial. This risk can be pronounced in projects that already face ongoing operational issues/disputes; potential financiers would be discouraged from investing into the project.

The tenure of the debt programme will also be assessed comparatively to the tenure of the lease agreement(s) with the data center offtakers. This will determine whether repayments are fully backed by cash flows, or if there is potential renewal risk. To incorporate this exposure, we typically assess whether the issuer is able to renew the initial lease on the property based on in-place contractual renewal terms or the issuer's past track record in securing tenants. MARC Ratings will also apply our legal analysis to determine whether the leases would survive a sale of the underlying building or buildings.

Summary

Factor	Remarks
Project owner and sponsors	Corporate profile, major shareholders, track record
Business risk analysis	
- <i>Construction and operation risk</i>	Project complexity, contractor capabilities, technology, operations and maintenance, insurance,
- <i>Market risk</i>	Occupancy level, type of data center, location, regulatory requirement, credit worthiness of the tenants, etc.
Financial risk analysis	
- <i>Profitability</i>	Income stability, revenue assumptions, margins, cost structure
- <i>Cash flow protection</i>	Quality of cashflow, sensitivity analysis, covenants
- <i>Capitalisation</i>	Access to funding, leverage level
Issue structure and terms	
- <i>Debt characteristics and terms</i>	Ranking seniority, amortisation profile
- <i>Structural features</i>	FSCR coverage, covenants, minimum balance requirements

ASSET-BACKED SECURITIES (ABS)

The ABS methodology focuses more towards data centre projects that have already achieved commercial operations date (no construction risk).

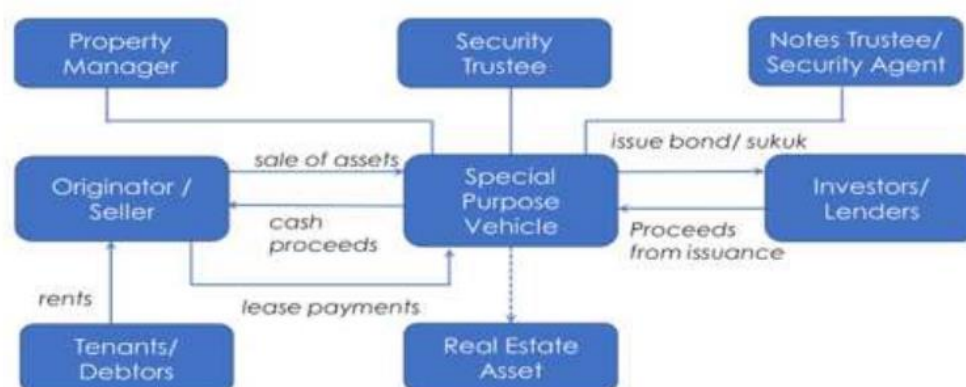
The owner/originator of an operational data centre would raise funding through the direct off-balance-sheet sale of equity interests in the project to a special purpose vehicle (SPV). Lease income generated from the project is then used to pay off profit obligations. The project itself may then be sold to redeem the principal obligations, usually 1-2 years before the maturity date.

Accordingly, this methodology would be more applicable to co-location data centres, which are typically leased out to multiple tenants by the owner.

Key areas in our assessment include:

- Transaction structure
- Valuation of collateral property

Transaction Structure



In a typical transaction, the originator sells its data centre to the SPV, which in turn leases the asset back to the originator. The SPV pays for the asset via proceeds from the issuance of bond/sukuk.

Management of the property, including rental collection, is usually done by the property manager, while the security trustee holds the data centre on behalf of sukuk holders and has power of attorney to accelerate or early amortise the notes by disposing the property upon occurrence of trigger events. The security agent also monitors compliance with imposed covenants.

Trigger events

Trigger events are incorporated to address potential default risk by allowing the trustee sufficient headroom to undertake remedial measures upon occurrence. These include underperformance that breaches financial covenants under the transaction as well as failure to complete refinancing/redemption of notes in time (typically two years prior to the legal maturity date).

Valuation of Collateral Property

1. Determining the NOI of the property

The first step in valuation involves deriving the net operating income (NOI) of the collateral data center after deducting all operating expenses. MARC Ratings examines the rental track record of at least three years.

To ascertain the stability and quantum of cash flow generation, the following are evaluated:

- a) Tenancy agreements and profile – tenancy terms including tenure, termination options, rental review options, and conditions on the distribution of costs between property owner and tenants.
- b) Occupancy level – the occupancy track record of the data center is evaluated and compared against occupancy levels of similar ones in the surrounding areas. Prospects of occupancy are determined with research data on market and macroeconomic conditions, location and quality of the centre, importance of the centre to tenants, as well as the presence (or lack thereof) of an anchor tenant.
- c) Rental rate – rental rate trends of the data centre and similar ones in the surrounding areas are examined. Available data from market research are used to arrive at this comparison.

2. Determining the stabilized NOI of the property

The stabilized NOI is then computed as the average NOI over typically a five-year period that includes the current year, the preceding year, and the projected next three years.

The NOI for the current and preceding year are obtained from the audited accounts while the projected NOI is derived from sensitising key variables namely occupancy level and rental rate. Assumptions on future occupancy level and rental rate are based on the outlook of the property subsector that relates to the collateral property.

Depending on the property type, rental reviews and intervals vary subject to negotiations between the tenant and property owner. Therefore, variable or optional rent increases upon renewal are not considered in the projections.

3. Determining the capitalisation rate

The capitalisation (cap) rate is an estimated required rate of return on any property asset. MARC uses different cap rates based on the type of property assets to reflect the level of risk. A lower cap rate indicates a lower level of risk and therefore a lower return for the property while a higher cap rate reflects the reverse.

Within the data centre space, the cap rate can be adjusted to reflect the relative risk depending on quality, location, and tenant profile, among others. The rating agency also generally uses a conservative cap rate to value commercial properties to allow for greater stability on the value of the collateral property, especially during extreme ends of property cycles.

4. Ascertaining the value of the property

MARC Ratings' ascertained value of a collateral property is calculated by dividing the stabilised NOI by the cap rate applied to the property under the rating agency's income capitalisation approach. This creates an expected property value, which is typically lower than the current market value. Positive or negative adjustments may also be applied subject to the changes in the stabilised NOI.

Loan-to-value (LTV)

The ascertained value of the collateral data centre is then used for loan sizing. The LTV reflects the level of stress to the collateral value that is appropriate for the given rating level. For example, for an LTV of 40% at AAA rating level, a property would generally have to lose more than 60% of its market value for there to be a loss on the AAA portion of the loan proceeds.

The LTV ratio for the respective rating band reflects the allowable limits of maximum amount of debt that can be raised at each rating category. Debt sizing into senior and junior or subordinated tranches with sequential cash flow waterfall redistributes credit risks, prioritising payment for higher rated bonds before the subordinated piece.

For full details of the ABS methodology, please refer to MARC Ratings' Commercial Real Estate-Backed Securitisation methodology.

REAL ESTATE INVESTMENT TRUST (REIT)

Pools of operational data centres may also be formed into a Malaysian real estate trust fund (M-REIT).

MARC Ratings' REIT methodology focuses on the asset quality of the pool of data centres, factors that will impact the performance of the data centre market, as well as the evaluation of the property managers appointed to manage the REITs.

Key areas in our assessment include:

- Asset quality
- Operating strength
- Management
- Financial Analysis

Asset Quality

MARC Ratings will assess the risk profile of each data centre in the M-REIT by focusing on the macroeconomic and microeconomic factors that would impact asset performance. These include examining property market cycles, the supply and demand dynamics in the areas where the properties are located, the outlook for economic growth and the interest rate environment.

In its assessment, MARC Ratings will also seek the latest valuation report on each of data centres in the M-REIT portfolio from qualified valuers and conduct onsite inspections of key centers. For greenfield projects, the rating agency would assess the REIT manager's capability to construct and manage the project.

Operating Strength

MARC Ratings will evaluate the ability of the properties to generate sustainable and stable rental streams relative to the portfolio's debt obligations. The portfolio's diversity in terms of asset usage, geographic and tenant-mix would support its operating stability.

In general, MARC Ratings considers a geographically diversified portfolio to be more favorably inclined to generate sustainable cash flow, though the benefits from the diversification could be tempered if the assets are seen to be susceptible to similar risk factors.

For tenant mix, MARC Ratings will evaluate the quality of tenants from the list provided by management by assessing their creditworthiness, the diversity of major tenants, the percentage of rental space occupied by major tenants and the nature of the tenancy agreements. MARC Ratings will also examine historical tenancy and evaluate management policies that are in place to minimize these risks.

Given that different types of data centres have varying degree of risk, the composition of the portfolio in terms of revenue contribution will be assessed.

Management

MARC Ratings will examine the caliber and track record of the manager of the M-REIT portfolio by evaluating its policies on tenant selection and management strategy, as well as the manager's past and current investment criteria in order to determine the prospects for the M-REIT.

MARC Ratings will also ascertain if the manager's investment plans are in line with the REIT's vision and assess the track record of successful implementation to date. Risk appetite in relation to acquisition and divestments will also be considered.

Finally, the manager's role in carrying out effective risk management will be assessed by examining internal policies on managing different risk factors. In addition, the manager's ability to provide timely valuation reports on all of the M-REIT's properties, and other reports as required by regulatory authorities will be taken into consideration.

Financial Analysis

Several key financial ratios will be assessed; for profitability, bearing in mind that distribution of a significant portion of its earnings is an intrinsic characteristic of a M-REIT.

Profitability

- NOI/Net operating cost
- Expenses/operating income
- Operating margins
- Dividend payout ratio
- Return on assets

A trend analysis of these measures will indicate the ability of the M-REIT to operate within the parameters of its stated objectives and help identify contributing factors to the strength and weakness of its performance. The dividend payout will provide insights on the M-REIT's financial policy on balancing income distribution to unit holders and payment to creditors and its cash retention capacity to fund future growth of its business. MARC Ratings will also look to obtain financial projections and make any appropriate adjustments.

Cash flow coverage

- CFO/Interest coverage
- CFO/Debt coverage
- EBITDA/Interest
- FSCR

Cash flow coverage ratios are an important measure to assess the extent to which M-REIT's financial obligations are covered by its operating cash flow. MARC Ratings will also carry out sensitivity tests to assess the sustainability and stability of the future cash flow projections by varying the occupancy levels, rental rates, interest payments as well as other inputs.

Capital structure

- Total debt/Capital
- Short-term debt/Capital
- Long-term debt/Capital
- Debt/market value
- Debt/EBITDA

The M-REIT's gearing level will be compared with its internal policy as well as to the prevailing limit set by the regulatory body which has set the statutory debt limit at 50% of asset value. MARC Ratings will assess the ability of the M-REIT to manage its capital prudently and examine the collateral margin on its assets to determine the available buffer should the value of the assets deteriorate.

For full details of the REIT methodology, please refer to MARC Ratings' Debt Securities Issued by Malaysian REITs methodology.

Footnotes

[1][2] Moody's sector in-depth report on data centres "Rapid Expansion broadens into new markets, offers benefits for some sectors", dated July 24, 2024.

[3] KPKT publication, "Planning guideline for data centre", dated October 10, 2024.

[4] IBM, "What is a hyperscale data center", retrieved from www.ibm.com

Appendix

- PUE requirements by country:
 - Singapore (1.3)
 - India (no min requirements, green rating system instead, with maximum score for PUEs of 1.1-1.4 in general)
 - China (1.25-1.4)
 - USA (1.2-1.5)

Source links:

- <https://www.mida.gov.my/mida-news/taking-a-hard-look-at-data-centres/> (PUE local + SG)
- https://igbc.in/frontend-assets/html_pdfs/IGBC%20Green%20Data%20Center%20Rating%20System%20Pilot%20version%20Oct%202016.pdf (India PUE rating system)
- https://enviliance.com/regions/east-asia/cn/report_10060#:~:text=The%20PUE%20of%20a%20data,specified%20in%20the%20table%20below. (China PUE requirements)
- <https://graphicalnetworks.com/federal-data-centers-us-mandate-for-dcim-software-and-pue-requirement/#:~:text=New%20Mandate%20for%20Federal%20Data,these%20new%20requirements%20by%202018.> (US PUE requirements)

Disclaimer

Copyright © 2024 MARC Ratings Berhad and any of its subsidiaries or affiliates ("MARC Ratings") have exclusive proprietary rights in the data or information provided herein. This report is the property of MARC Ratings and is protected by Malaysian and international copyright laws and conventions. The data and information shall only be used for intended purposes and not for any improper or unauthorised purpose. All information contained herein shall not be copied or otherwise reproduced, repackaged, transmitted, transferred, disseminated, redistributed or resold for any purpose, in whole or in part, in any form or manner, or by any means or person without MARC Ratings' prior written consent.

This report is strictly confidential and privileged and is intended solely for the information and benefit of the addressee or recipient. If you are not the intended recipient, and/or have received this report in error, please delete this report and do not copy, disseminate, distribute or disclose the content of this report to any other person.

Ratings are solely statements of opinion and therefore shall not be taken as statements of fact under any circumstances. The information which MARC Ratings relies upon to assign its ratings includes publicly available and confidentially provided information obtained from issuers and its advisers including third-party reports and/or professional opinions which MARC Ratings reasonably believes to be accurate and reliable to the greatest extent. MARC Ratings assumes no obligation to undertake independent verification of any information it receives and does not guarantee the accuracy, completeness and timeliness of such information. MARC RATINGS OR ITS AFFILIATES, SUBSIDIARIES, DIRECTORS AND EMPLOYEES DISCLAIM ANY WARRANTY, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY AS TO THE ACCURACY, COMPLETENESS OR TIMELINESS OF ANY INFORMATION CONTAINED HEREIN FOR ANY PARTICULAR PURPOSE AND SHALL NOT IN ANY EVENT BE HELD RESPONSIBLE FOR ANY DAMAGES, DIRECT OR INDIRECT, CONSEQUENTIAL OR COMPENSATORY, ARISING OUT OF THE USE OF SUCH INFORMATION. MARC will not defend, indemnify or hold harmless any user of this report against any claims, demands, damages, losses, proceedings, costs and/or expenses which the user may suffer or incur as a result of relying on this report in any way whatsoever. Any person making use of and/or relying on any credit analysis report produced by MARC Ratings and information contained therein solely assumes the risk in making use of and/or relying on such reports and all information contained therein and acknowledges that this disclaimer has been read and understood and agrees to be bound by it.

A credit rating is not a recommendation to buy, sell or hold any security and/or investment. Any user of this report should not rely solely on the credit rating and analysis contained in this report to make an investment decision in as much as it does not address non-credit risks, the adequacy of market price, suitability of any security for a particular investor, or the tax-exempt nature or taxability of payments made in respect to any security concerned.

Ratings may be changed, placed on MARCWatch, suspended or withdrawn at any time for any reason at the sole discretion of MARC Ratings. MARC Ratings may make modifications to and/or amendments in credit analysis reports including information contained therein at any time after publication as it deems appropriate.

MARC Ratings receives fees from its ratees and has structured reporting lines and compensation arrangements for its analytical members in a manner designed to promote the integrity of its rating process, and to eliminate and/or manage actual and/or potential conflicts of interest.

© 2024 MARC Ratings Berhad

Published by:

MARC RATINGS BERHAD 202001041436 (1397757-W)
19-07, Level 19, Q Sentral, 2A Jalan Stesen Sentral 2, Kuala Lumpur Sentral, 50470 KUALA LUMPUR
Tel: [603] 2717 2900 Fax: [603] 2717 2920
E-mail: ratings@marc.com.my Website: www.marc.com.my