S&P Global
Ratings

Research

Presale:

Vantage Data Centers Issuer LLC/Vantage Data Centers Canada L.P. (Series 2023-1)

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Preliminary Rating

Class	Preliminary rating(i)	Preliminary amount (mil. $)	Maximum LTV ratio (%)(ii)	Anticipated maturity (years)	Legal maturity (years)
A-2	A- (sf)	370.00	70	5	25

Note: This presale report is based on information as of March 8, 2023. The rating shown is preliminary. Subsequent information may result in the assignment of a final rating that differs from the preliminary rating. Accordingly, the preliminary rating should not be construed as evidence of a final rating. This report does not constitute a recommendation to buy, hold, or sell securities. (i)The preliminary ratings do not address post-anticipated repayment date additional interest. (ii)The maximum allowable class A LTV ratio, according to the transaction documentation. LTV--Loan-to-value.

Profile

Expected closing date	March 21, 2023.
Collateral	Primarily the first mortgage liens on the asset entities' real property interests in the data centers; the security interests in the data centers' tenant leases, reserves, and escrows; the security interests in certain transaction accounts; and the equity interest in each of the asset entities.
Co-Issuers	Vantage Data Centers Issuer LLC and Vantage Data Centers Canada L.P.
Manager	Vantage Data Centers Management Co. LLC and Vantage Data Centers Canada Management L.P.
Servicer	Midland Loan Services, a division of PNC Bank N.A.
Indenture trustee	Wilmington Trust N.A.
Arrangers	Deutsche Bank Securities Inc., Trust Securities, and TD Securities.

Advance Notice Of Proposed Criteria Change: Data Center Securitizations

S&P Global Ratings announced on Jan. 18, 2023, that it is reviewing its approach for analyzing securitizations backed by data centers, and it aims to develop and publish specific criteria for this type of securitization. The ratings S&P Global Ratings assigns to the notes could change as a result of that review, depending on the final criteria adopted and our assessment of the transaction. We cannot provide an estimated completion date for our criteria review at this time (see "Advance Notice Of Proposed Criteria Change: Data Center Securitizations," published Jan. 18, 2023, for more information).

Transaction Overview

Vantage Data Centers Issuer LLC/Vantage Data Centers Canada L.P.'s series 2023-1 note issuance is a securitization of real estate and tenant lease payments for space and electrical capacity in Vantage Data Centers Management Co. LLC's and Vantage Data Centers Canada Management L.P.'s (collectively, Vantage's) 13 completed and operating wholesale data centers located in Santa Clara, Calif.; Quincy, Wash.; and Quebec, Canada.

No new properties were added to the master trust since the series 2021-1 issuance. However, the aggregate appraised value increased to approximately $3.71 billion for series 2023-1 from $3.63 billion for the series 2021-1 issuance, driven by increased leased capacity at the existing data centers, among other factors. The transaction's underlying collateral includes modified gross and enterprise leases. In both modified gross and enterprise leases, the tenant does not explicitly reimburse the landlord operating expenses (other than electricity in modified gross leases), taxes, and insurance expenses, although those expenses are typically accounted for in the tenant's base rent.

Series 2023-1 will be the eighth issuance from the master trust, and it will share collateral with the series 2018-2, 2019-1, 2019-2, 2020-1, 2020-2, and 2021-1 notes. Vantage will use a portion of the proceeds to repay in full the outstanding principal balance on the series 2019-1 class A-1 variable-funding note (VFN), as well as the outstanding principal balance on the series 2018-2 class A-2 notes. The remainder of the proceeds will be used for general corporate purposes, including transaction fees and expenses and future development of the data centers. Our analysis considered the series 2019-1 class A-1 VFN notes' maximum commitment amount of $375 million.

The table below shows the outstanding ratings on the master trust.

Outstanding ratings

Issue	Rating	Balance at issuance (mil. $)	Current balance (mil. $)	Anticipated maturity	Legal maturity
Series 2019-1 class A-1	A- (sf)	375.00	86.00(i)	Dec. 15, 2026	July 15, 2044
Series 2018-2 class A-2	A- (sf)	225.00	215.44(ii)	Nov. 15, 2023	Nov. 15, 2043
Series 2019-1 class A-2	A- (sf)	398.00	384.07	July 15, 2024	July 15, 2044
Series 2020-1 class A-2	A- (sf)	700.00	700.00	Sept. 15, 2025	Sept. 15, 2045
Series 2020-2 class A-2	A- (sf)	600.00	600.00	Sept. 15, 2027	Sept. 15, 2045
Series 2021-1 class A-2	A- (sf)	530.00	530.00	Oct. 15, 2026	Oct. 15, 2046
Series 2019-2 class B	BBB (sf)	220.00	220.00	Oct. 15, 2024	Oct. 15, 2044

(i)The maximum commitment on the series 2019-1 class A-1 notes is $375 million. The series 2019-1 class A-1 outstanding principal balance is expected to be repaid in full at closing. (ii)The series 2018-2 class A-2 outstanding principal balance is expected to be repaid in full at closing.

The transaction features an approximately $39.4 million liquidity reserve account at closing, and a cash trap trigger and an early amortization trigger at 1.35x and 1.20x three-month average amortization debt service coverage ratio (DSCR) levels, respectively. The series 2023-1 class A-2 notes has zero annual scheduled amortization, five-year anticipated repayment date (ARD) and 25-year legal maturity.

Most of the data centers in the portfolio are leased by hyperscale tenants, which typically require 500 kilowatts (kW) or more of capacity to operate their computing equipment and networks (consisting of racks and servers, network gear, electrical distribution, containment, and network wiring). These tenants typically manage server fleets measured in the hundreds of racks, and they choose to house their infrastructure in hyperscale data centers like the manager's in order to design and control their own network infrastructure and manage their costs without sharing allocated space with other customers.

In a turnkey tenant lease:

- The manager owns the critical mechanical and electrical infrastructure, and provides space, physical security, power and cooling, as well as ongoing maintenance of the power and cooling systems; and
- The tenants are fully responsible for all other aspects of their computing infrastructure.

Rationale

The preliminary rating assigned to Vantage Data Centers Issuer LLC's class A-2 data center revenue notes series 2023-1 reflects

- Our view of the lease portfolio's projected performance;
- The real estate value;
- The manager's and the servicer's experience;
- The advances by the servicer or indenture trustee if deemed recoverable;
- The available cushion as measured by the estimated closing date DSCR of 2.43x;
- The initial liquidity reserve deposit of $39.4 million covering the higher of three months of note interest and 12 months of senior expenses; and
- The transaction's structure.

We rated the notes under our "Principles of Credit Ratings," published Feb. 16, 2011, with certain stress assumptions borrowed from our triple-net asset-backed securities (ABS) criteria "Methodology And Assumptions For Rating North American Single-Tenant Real Estate Triple-Net Lease-Backed Securitizations," published March 2016. Wholesale data center leases are not in the scope of our triple-net ABS criteria due to the properties' multitenant nature and the fact that wholesale data center leases are not all triple-net, among other factors. As described below, we amended several of our typical triple-net lease assumptions to consider the limited historical performance of the wholesale data center sector and the manager, the multitenant nature of the data centers, and the possibility for average tenant credit quality to drift downward over the transaction's life.

Environmental, Social, And Governance (ESG) Factors

Our rating analysis considered the potential exposure of the transaction to ESG credit factors. In our view, the exposure to ESG credit factors in this transaction is in line with other transactions in the sector. Data center securitizations typically consist of a pool of data center properties and related leases with tenants.

Data centers are more exposed to environmental risks than other property types because physical climate risk could impact not only the building structure but also access to power. This risk is exacerbated in pools with relatively high concentration by geography and number of properties. Nonetheless, the properties are designed to be resilient to prolonged power outages, and the geographic diversity of the collateral pool may partially mitigate these environmental risks. Vantage's collateral pool consists of 13 data centers located in two states in the U.S. and a province in Canada, a similar concentration to other rated data center securitizations. To mitigate risks from extreme weather events (such as flood or earthquake), fire, and casualty events, or incidents of terrorism, tenants generally have insurance policies to mitigate the risk of natural disasters and damage-causing events.

Social credit factors are neutral for this sector because data centers are not as labor intensive and also are typically not subject to health and safety risks. Social trends towards working from home, online shopping, and increased digitization of workstreams all stand to support the growth and stability of data centers.

Governance credit factors for data center ABS are neutral. We considered Vantage's strategy, risk management, and internal controls within our operational risk assessment framework. Given that collateral pools are typically static, the roles and responsibilities of each transaction party and the allocation of cashflows are well defined, and transactions are structured to achieve isolation of the assets from the seller. However, governance weaknesses at the property manager levels could still have a negative rating effect.

Key Rating Considerations

In our analysis, we considered the following strengths, weaknesses, and mitigating factors of the transaction.

Transaction strengths

We considered the transaction's following strengths:

- The relatively long average contract terms, with a weighted average remaining term of 7.7 years (weighted by total annualized adjusted base rent AABR).
- The current tenants' high average credit quality (89.2% are investment grade [rated 'BBB-' and above] by AABR).
- The staggered lease maturities ranging from 2023 to 2036.
- The low historical customer churn rates, supported in part by the high cost of tenant relocation.
- The leases' importance to the tenants' core businesses.
- The in-place lease rates that are competitive with local market rates.
- The limited supply and strong demand for wholesale data center space in the data centers'

respective markets.

- The strong management team, which has extensive experience in data center operations.
- The class A loan-to-value ratio (LTV), which is constrained at 70% of the assets' appraised value.
- The draw conditions for the VFN, which require post-draw maintenance of a maximum 70% LTV ratio and a minimum 1.85x three-month average DSCR.
- The transaction's structural features, including performance tests that trigger cash trapping or early amortization if the DSCR drops below certain minimum thresholds.

Transaction Weaknesses

We considered the transaction's following weaknesses:

- The limited tenant diversity: approximately 60.5% of the leased capacity and 57.3% of AABR is attributable to one tenant, and 83.3% of the total AABR is attributable to the top five tenants.
- The limited industry diversity: most tenants are in various subsectors of the technology industry.
- The limited historical sector performance data: approximately 13 years for the wholesale data center segment.
- The limited geographic diversity: all data centers are in Santa Clara, Quincy, and Quebec; approximately 71.5% of AABR comes from data centers located in Santa Clara.
- The liquidity reserves, sized to approximately three months of note interest, could prove insufficient if a disruptive event, such as a natural disaster, rendered any of the data center campuses inoperable for an extended period.
- The limited restrictions on the terms of future eligible leases, such as tenant credit quality, contract length, and optional termination features, which means the overall credit risk profile of the lease portfolio could erode over time.
- The potential for decreased data center demand: upon lease expiration, tenants with reduced needs could choose to migrate to the public cloud or other retail colocation data centers, while tenants with increased needs could opt to build, own, and operate their own data centers.
- The supply and demand conditions within the data centers' local markets could change adversely over time, driving down lease rates or driving up vacancy rates.
- The high current demand for data center operations personnel could make it expensive to replace current key members of the sponsor's leadership team, including the chief operating officer and senior engineering team members.

Mitigants To Transaction Weaknesses

We believe the following factors partly mitigate the transaction's weaknesses:

- Vantage's strong operational history, with no tenant default.
- The underlying tenants' initial credit quality, with the largest tenant rated 'AAA' comprising 57.3% of AABR and the top five tenants are all investment-grade rated.

- The high costs for tenants to move to alternative data centers, including time, redundancy (to avoid service interruption), and logistical expenses (moving or duplication of network gear, racks, servers, and related fit-out).
- The requirement that the issuer maintain comprehensive liability, fire, earthquake, extended coverage, business interruption, and rental loss insurance policies, which we expect to be compliant with the minimum requirements of our insurance criteria for U.S. and Canadian commercial mortgage-backed securities (CMBS) transactions.
- The decreased wholesale data center demand due to the migration of the manager's smaller tenants to the public cloud or retail colocation may be offset by increased demand from the manager's larger tenants, some of which are themselves retail colocation and public cloud providers.
- The manager's role as a provider of data center space to retail colocation and public cloud tenants, which may allow it to benefit from increased demand even as smaller tenants choose to migrate to colocation or public cloud data center providers.
- The servicer advancing interest, priority operating expenses, and maintenance capital expense, with a backup obligation by the indenture trustee, Wilmington Trust N.A.
- The stress scenarios performed in our cash flow analysis, which considered the pool's industry concentration, the limited industrial history, and the potential for downward migration in average tenant credit quality.
- The timely interest and ultimate principal payments paid on the notes by the legal final maturity under our stress scenarios.
- The change of control, which could lead to an event of default and rapid amortization of the notes. In addition, the probability of an acquisition by the key tenants' direct competitors is relatively low, in our view, due to the potential erosion on the data centers' property value if the specified tenant leases were to terminate before their contractual expiration.

Wholesale Data Centers

Data centers are real estate facilities that house computer servers and network equipment within a highly secure environment with redundant mechanical, cooling, and electrical power systems and network connections. The wholesale data center operator, Vantage, is responsible for maintaining the facility's infrastructure, providing physical security, and re-leasing the sites' capacity as it becomes vacant. Wholesale tenants are entirely responsible for the maintenance and management of their racks, storage, and networking equipment.

Wholesale data centers, like those managed by Vantage, place the entire responsibility for managing the tenant's network and equipment on the tenant, whereas retail colocation facilities, which tend to support tenants with shorter-term and smaller capacity needs, may offer varying levels of hands-on support and other services. In either the wholesale or retail data center model, the proper provision of uninterruptable power and cooling is critical to avoid any disruption in the tenant's business operations, especially those whose services necessitate consistent connection to their network through these data centers.

Data center leases are structured in various ways, including triple-net and modified gross leases. Triple-net leases require tenants to reimburse the site manager for costs, including taxes, insurance, operating expenses, and electricity. Modified gross leases, on the other hand, only require the tenants to reimburse the manager for their electricity expense. Under both types of leases, tenants are responsible for all costs related to the provision, installation, and upkeep of their equipment and network connectivity. Modified gross leases are expected to comprise 98% (by AABR) of the annualized base rent generated by the transaction's portfolio as of the closing date. However, this proportion could change over time as capacity is released to future tenants.

Industry Characteristics: Data Center Sector Outlook

We believe the exponential increase in data usage, broad migration to the cloud, and transition to a fully digitized economy will continue to shape demand for third-party operated data centers. Overall supply and demand is relatively balanced as new data center development has been constrained in certain markets by site availability, lingering supply chain issues, and more recently, power capacity constraints.

Although we expect data centers to see some growth deceleration in a recessionary environment, we believe it will be mitigated by the critical nature of data centers. Against the high inflation backdrop, elevated raw material costs, coupled with rising cost of capital and possible material shortages, could slow the pace of expansion and medium-term revenue growth rates of data center operators.

We also believe the long-term industry risks include shifting technology, cloud service providers in-sourcing their data center needs, tenant concentration, and weaker pricing trends in hyperscale segments. Nonetheless, market data suggest that 2022 vacancy rates were low for key data center markets and rental rates increased year over year.

Business Description: Vantage

Founded in 2010 and acquired by a Digital Bridge-led consortium in 2017, Vantage is a leading owner, developer, and operator of large, multitenant wholesale data centers in North America. In this securitized portfolio, it operates 13 data centers across five campuses (two in Silicon Valley; one in Quincy, Wash.; and one each in Québec City and Montréal, Canada). It also owns other data centers and real estate that do not collateralize this transaction, including additional campuses under development in Northern Virginia and Arizona. The Vantage leadership team has extensive experience in data centers. Its main shareholder, Digital Bridge, was founded in 2013, and it has significant ownership interests in various other communications infrastructure companies, including cell tower manager Vertical Bridge. Vantage's customer base includes tenants across a range of sectors, such as cloud computing, manufacturing, hardware, software, retail data centers, data analytics, and ecommerce.

The ABS portfolio includes over 174 megawatts of leased capacity and over $272 million of annualized adjusted base rent.

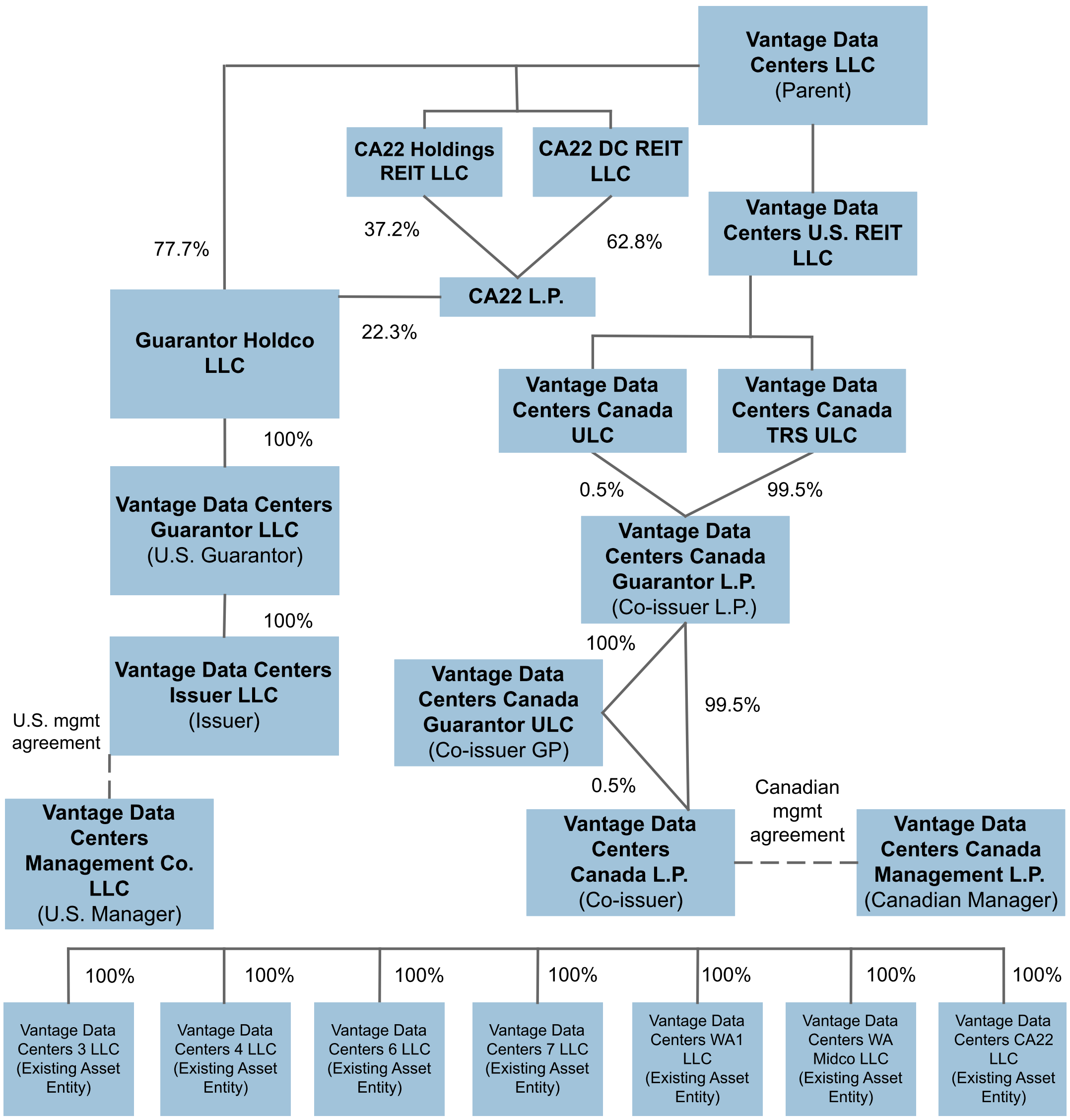
Transaction Structure

Chart 1 shows an overview of the transaction's structure. The issuer, Vantage Data Centers Issuer LLC, is a bankruptcy-remote, Delaware limited-liability company formed solely to hold the equity interests and to issue notes. The issuer will be a direct wholly owned subsidiary of the guarantor and an indirect wholly owned subsidiary of Vantage Data Centers LLC. The co-issuer, Vantage Data Centers Canada L.P., is a recycled bankruptcy-remote, Canadian limited partnership with limited purposes to hold equity interests, interests in data centers (and related tenant leases), and to co-issue notes. The issuer has granted a security interest in each asset entity's equity interest to the indenture trustee as collateral security for the notes on noteholders' behalf.

Series 2023-1 notes will be the eighth issuance for this issuer. The issuer may issue additional series of notes (subject to the satisfaction of certain conditions, including DSCR and LTV ratio tests) that are secured by the entire collateral pool. Future series issuance will share collateral within this master trust.

Chart 1

Transaction Structure



Pool And Structural Characteristics

Series 2023-1 is a securitization of:

- The fee simple ownership interests and related lease revenue in 10 operating wholesale data centers: eight in Silicon Valley (Santa Clara, Calif.) and two in the Pacific Northwest (Quincy, Wash.); and
- Ownership interests (real rights) in immovable property and related lease revenue in three data centers: two in Québec City, Canada and one in Montréal, Canada.

The data centers represent a total of approximately 1.536 million gross square feet and about 176.1 megawatts of completed critical load power available to tenants to operate their servers and computing equipment.

Table 1 provides a comparison of the pools of data centers and their respective leases.

Table 1

Pool Characteristics

	Vantage 2023-1	Vantage 2021-1	Aligned 2022-1	Sabey 2022-1/2	Compass 2022-1	Stack 2021-1
Appraised value of data centers (mil. $)	3,718	3,636	2,626	2,002	1,131	2,134
No. of data centers	13	13	5	6	13	8
No. of tenants	18 (not including enterprise tenants)	14	32	92	5	26
S&P Global Ratings' value (mil. $)(i)	1,883	1,609	1,279	833	452	1,032
S&P Global Ratings' weighted average cap rate (%)(ii)	8.83	8.75	8.69	8.75	9.06	8.75
CLP leased (kW)	174,422	157,900	161,466	76,082	43,525	128,895
Capacity ramped (kw)	163,071	148,750	130,308	69,430	34,911	84,385
Total potential CLP (kw)	176,100	175,700	162,000	81,849	43,525	133,980
Annualized adjusted base rent (AABR) (mil. $)	272.9	236.6	174.0	120.9	55.1	143.4
Turnkey (%) (ii)	100.0	100.0	100.0	78.0	100.0	94.9
Powered shell (%) (ii)	0.0	0.0	0.0	22.0	0.0	5.1
% leases triple-net(ii)	0.0	0.0	0.0	19.0	32.8	55.0
% leases modified gross(ii)	100.0(iii)	100.0	100.0	81.0	67.2	45.0
Weighted average original lease term (years) (ii)	11.8	12.1	7.0	12.1	10.0	10.6

Table 1

Pool Characteristics (cont.)

	Vantage 2023-1	Vantage 2021-1	Aligned 2022-1	Sabey 2022-1/2	Compass 2022-1	Stack 2021-1
Weighted average remaining lease (years) (ii)	7.7	9.0	5.0	6.3	5.6	7.0
Range of original lease (mos.)	36-240	36-240	36-144	36-294	53-182	12-200
Range of remaining lease (mos.)	2-163	1-167	1-120	1-155	3-168	10-162
Closing date DSCR	2.43	2.61	2.47	2.07	2.22	2.19
% of investment-grade tenants (ii)	89.2	89.8	62.2	69.3	67.2	70.9
Largest five tenants (% of AABR)	83.3	86.7	74.3	49.6	100.0	67.0
Largest five tenants(ii)	Tenant 1 (57.3%), tenant 2 (12.4%), tenant 3 (4.8%), tenant 4 (4.7%), and tenant 5 (4.0%)	Tenant 1 (58.7%), tenant 2 (12.7%), tenant 3 (5.6%), tenant 4 (5.3%), and tenant 5 (4.3%)	Tenant 1 (26.4%), tenant 2 (19.3%), tenant 3 (11.3%), tenant 4 (10.5%), and tenant 5 (6.9%)	Tenant 1 (15.9%), tenant 2 (12.7%), tenant 3 (9.0%), tenant 4 (6.0%), and tenant 5 (6.0%)	Tenant 1 (54.2%), tenant 2 (22.1%), tenant 3 (6.7%), tenant 4 (4.0%), and tenant 5 (12.9%)	Tenant 1 (22.0%), tenant 2 (20.5%), tenant 3 (10.2%), tenant 4 (8.4%), and tenant 5 (6.2%)
Largest three business sectors(ii)	Cloud (60.6%), tech hardware (16.4%), and software (6.3%)	Cloud (63.1%), tech hardware (16.5%), and big data (6.2%)	Cloud (40.7%), tech (34.8%), and financial services (12.7%)	Technology (71.0%), health care (14.4%), and media (3.3%)	Hyperscaler (67.2%), colocation datacenter (28.8%), enterprises (4.0%)	Big data (37.9%), media (22.5%), telecom (15.5%)
State concentrations(ii)	California (71.5%), Washington (11.8%), and Quebec (16.7%)	California (72.4%), Washington (13.5%), and Quebec (14.1%)	Arizona (43.3%), Utah (25.1%), Virginia (24.2%), and Texas (7.5%)	Washington (80.8%), Virginia (11.0%), and New York (8.2%)	Quebec (54.2%), Ontario (12.9%), Texas (8.0%), Tennessee (7.3%), North Carolina (7.2%), Minnesota (6.7%), and Oklahoma (3.6%)	Texas (24.7%), Oregon (22.9%), Illinois (22.1%), California (14.0%), Virginia (8.3%), Georgia (7.1%), and Ohio (0.9%)

(i)Represents the liquidation value estimated in accordance with "CMBS Global Property Evaluation Methodology," published Sept. 5, 2012. (ii)By annualized adjusted base rent. (iii)Including 2.0% enterprise leases. Aligned--Aligned Data Centers Issuer LLC. Sabey- Sabey Data Center Issuer LLC. Compass--Compass Datacenters Issuer LLC. Stack--Stack Infrstrastructure Issuer LLC. Vantage--Vantage Data Centers Issuer LLC. CLP--Critical load power. DSCR--Debt service coverage ratio. kW--Kilowatt.

Charts 2-6 provide additional details about the underlying portfolio.

Chart 2

Tenant Credit Rating

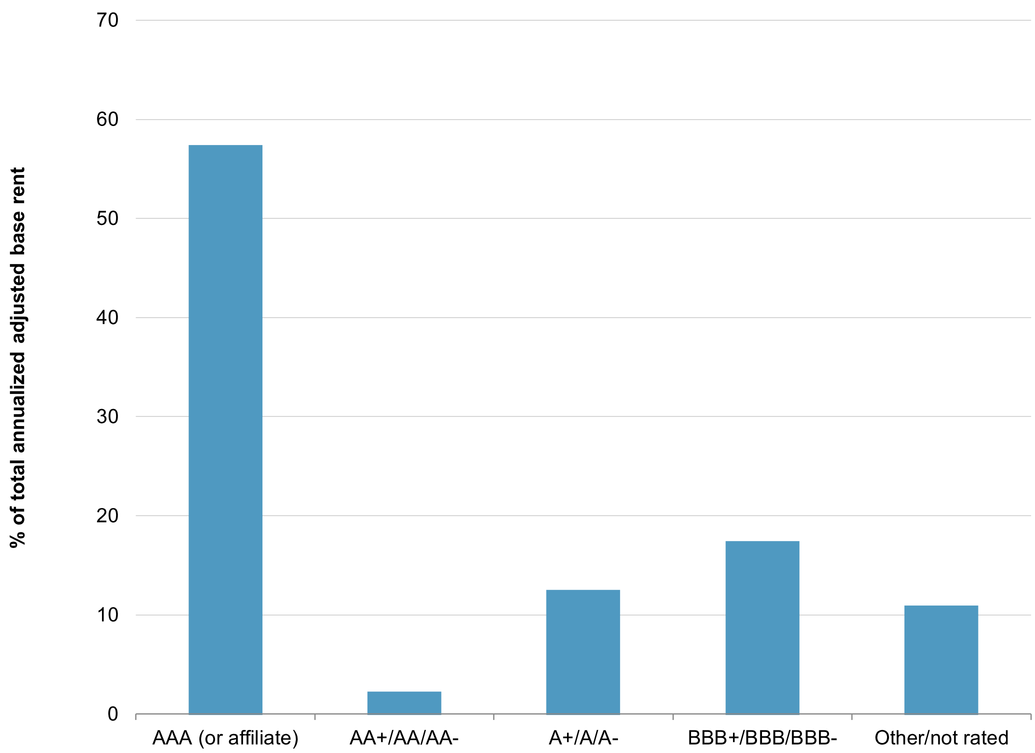


Chart 3

Portfolio Distribution By Tenant

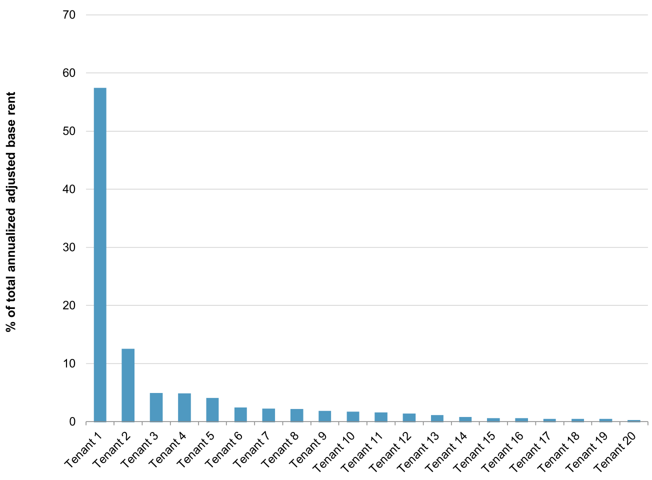


Chart 4

Portfolio Distribution By Industry

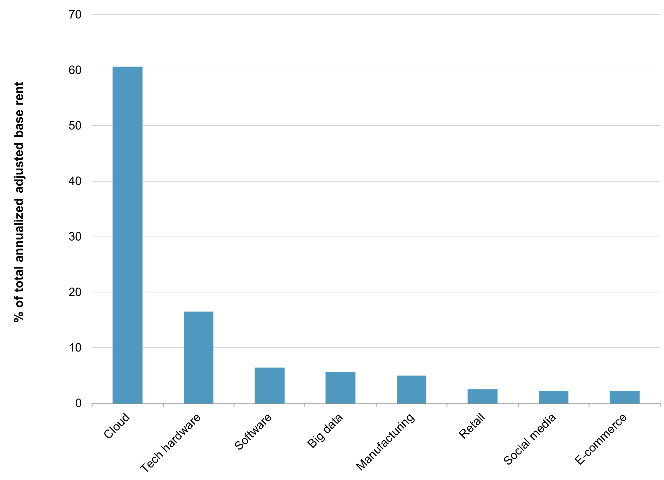


Chart 5

Portfolio Distribution By Monthly Rent ($/kW)

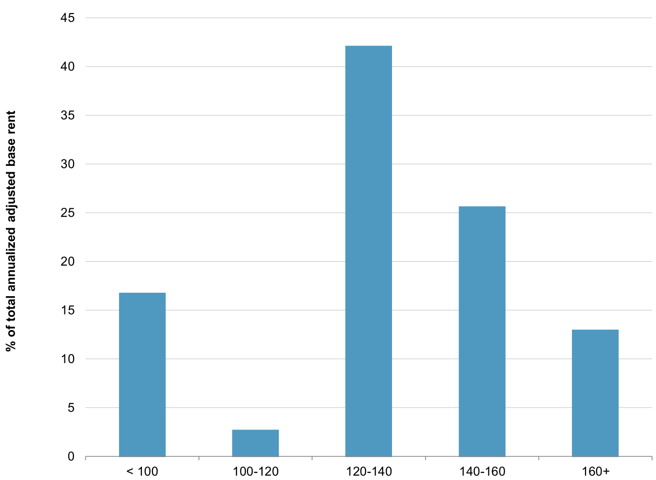
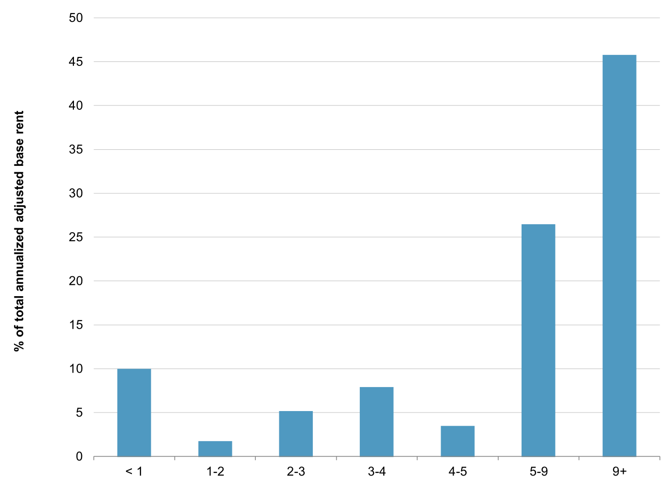


Chart 6

Portfolio Distribution By Remaining Term (Years)



Manager Operating Duties

Vantage, as the manager of the transaction, will have certain operating duties specified in the management agreement. Those duties include:

- Marketing the data center space to new tenants;
- Negotiating and executing new tenant leases and renewals;
- Administering tenant leases, including invoicing rent and other receipts, and managing

delinquencies and defaults;

- Maintaining insurance (including property, casualty, and business interruption);
- Paying real and personal property taxes;
- Keeping the data centers in compliance with applicable laws and regulations;
- Providing for necessary maintenance and arranging for utilities (including electricity), services, equipment, and supplies;
- Providing physical security to the data centers, including guards, fingerprint monitors, fencing, and other mechanisms to provide for the physical safety of tenants' infrastructure; and
- Managing capital improvements and other construction in connection with the leasing of site space.

The co-issuers will pay Vantage a monthly management fee equal to 3.0% of the aggregate base rent as compensation for those duties (not including the operating and maintenance capital expenses).

Manager Performance Obligation

Because all arrangements in the portfolio are turnkey, the tenant leases include service-level agreements (SLAs) that require the manager to provide uninterrupted levels of electricity, access, and cooling to the tenant. In support of that requirement, the manager maintains, as part of the data center infrastructure, backup batteries and generators that provide uninterrupted power in the event of temporary electric utility outages.

Most SLAs provide remedies for the prolonged or repeated interruption of critical services. These remedies are generally limited to the reimbursement of a portion of already paid rent in proportion to the duration of the outage (although, in practice, no cash flows would be paid back to the tenant and would merely be netted against future rent obligations). Based on our assessment of the manager's operational procedures, the experienced management team, and the negligible number of SLA breaches during its operating experience, we believe SLA breaches represent a minimal risk to the cash flows.

Transaction Expenses

Transaction expenses, other than the management fee, fall into the three categories summarized in table 2.

Table 2

Expenses

Expense category	Payment priority	Expenses covered	Monthly budgeted expense amount(i)
Priority expenses	First payment in application of funds.	Real property taxes, insurance premiums, electricity (subsequently charged to the tenants), and, if applicable for future series, rents payable relating to any data center including any ground rents.	$11.36/kW for the Santa Clara 1 data centers, $13.54/kW and $12.18/kW for the Santa Clara 2 data centers, $15.16/kW and $7.70/kW for the Quincy data centers, $19.00/kW for the Montreal data center, and $15.00/kW for the Quebec City data centers, subject to an annual 2.0% escalator.
Operating expenses	Fifth payment in application of funds (following the payment of note interest); excess operating expenses paid in the seventh payment in application of funds (subject to servicer's approval).	Site operations, physical security, other utilities (water, sewage, trash removal), and miscellaneous.	$8.83/kW for the Santa Clara 1 data centers, $12.89/kW for the Santa Clara 2 data centers, $24.29/kW and $11.67/kW for the Quincy data centers, $14.07/kW for the Montreal data center, and $12.99/kW for the Quebec data centers, subject to an annual 2.0% escalator.
Maintenance capital expenses	Fifth payment in application of funds (following the payment of note interest).	Maintenance and replacement of batteries, capacitors (uninterruptable power supply) electrical switches and generators, chiller plants, cooling towers, motors and compressors, and other infrastructure components.	$4.60/kW subject to an annual 2.0% escalator.

(i)Applied against aggregate critical load power of the completed data centers. kW--Kilowatt.

Based on the manager's expense estimates, expense estimates provided by the independent real estate appraiser in conjunction with the data center appraisals, and comparable values we've seen in CMBS transactions, we believe the expenses budgeted for in the payment priority are adequate. Furthermore, in the Sensitivity Analysis section below, we estimated the break-even increase in the operating and maintenance capital expenses--beyond the 2.0% annual escalation currently budgeted for in the transaction documentation--that the transaction can withstand while still paying timely interest and ultimate principal.

Payment Priority

On each distribution date, the available funds will be used to pay expenses, interest, and principal in the priority shown in table 3.

Table 3

Collateral Pool Expense Waterfall

Priority	Payment
1	Priority expense reserve.
2	Prior payment dates' unpaid indenture trustee, servicing, and other servicing fees; then unreimbursed advances and interest; and then any remaining unpaid indenture trustee, servicing, and other servicing fees.

Table 3

Collateral Pool Expense Waterfall (cont.)

Priority	Payment
3	Additional issuer expenses to the indenture trustee, servicer, and/or other applicable person so as not to exceed the annual additional issuer expense limit; and then the VFN agent fee.
4	Accrued note interest for all notes and accrued and unpaid commitment fees, as well as other fees, expenses, and other amounts due to the VFN notes.
5	Monthly expense amount to the obligors in excess of amounts drawn from the liquidity reserve for operating and capital expenditures.
6	Unpaid management fee to the manager.
7	Operating expenses and maintenance capital expenditures for current calendar month in excess of amounts drawn from the liquidity reserve subaccount, subject to servicer approval.
8	Required liquidity reserve amount.
9	If an amortization period is not then in effect and no event of default has occurred and is continuing, an amount equal to any class A LTV test sweep amount as of the application date.
10	If an amortization period is not then in effect, a cash trap condition is not then in effect, and no event of default has occurred and is continuing, an amount equal to the class A-2 monthly amortization amount for any class A-2 notes of a series.
11	If an amortization period is not then in effect and no event of default has occurred and is continuing, the additional principal payment amount together with any applicable prepayment consideration.
12	If after the ARD for any series of outstanding VFN or term notes, an amortization period is not in effect and no event of default is continuing, the aggregate unpaid principal balance of the outstanding VFN notes or term notes.
13	If a cash trap condition is continuing and no event of default has occurred and is continuing, the remaining amount of available funds to the cash trap reserve sub-account.
14	During an amortization period or continuation of an event of default, the principal balance of all outstanding notes.
15	Contingent interest, deferred contingent interest, post-ARD additional interest, and deferred post-ARD additional interest.
16	Additional issuer expenses not paid in item 3 due to the annual additional issuer expense limit plus accrued interest to the indenture trustee, servicer, and/or other applicable person.
17	Executed forward starting lease reserve amount at the direction of the manager.
18	Optional payments on the principal to the class A-1 noteholders at the direction of the issuer.
19	Manager-determined amounts to the capital expenditures reserve subaccount.
20	Unreimbursed advances, including advance interest, to the manager.
21	Any unreimbursed shortfall payments made by the issuer or co-issuer.
22	The remaining available funds to the issuer or co-issuer.

ARD--Anticipated repayment date. VFN--Variable-funding note. LTV--Loan to value.

In the payment priority, the class A notes interest is senior to the class B notes interest, and the class A notes principal is senior to the class B notes principal.

A cash trap condition will occur if the three-month average amortization DSCR is less than 1.35x (the cash trap amortization DSCR), and it will continue until it is above 1.35x for two consecutive determination dates. During a cash trap condition, excess cash flow otherwise payable to the issuer or co-issuer will be diverted to the cash trap reserve subaccount.

An amortization period will occur if the three-month average amortization DSCR is less than 1.20x (the minimum amortization DSCR), and it will continue until it is above 1.20x for two consecutive determination dates. During an amortization period, or after and during an event of default, all excess cash flow will be applied to the aggregate unpaid principal amount of the notes sequentially across classes and pro rata among outstanding notes of the same class.

The amortization DSCR is calculated as the ratio of the annualized adjusted net operating income to mandatory debt service--where mandatory debt service consists of interest on all notes to be paid over the succeeding 12 payment dates--plus 30-year mortgage-style principal that would be paid over the succeeding 12 periods if class A note principal payments were determined assuming a 30-year remaining term and an interest rate equivalent to the blended average rate of all outstanding class A notes, and plus commitment fees on any class A-1 notes to be paid over the succeeding 12 payment dates.

The servicer must make interest advances on the notes, if deemed recoverable. The advances are meant to cover any shortfalls resulting from timing mismatches because of missed lease payments and any interest shortfalls. This requirement excludes make-whole amounts, post-anticipated repayment date (ARD) additional interest, and deferred post-ARD additional interest. If the servicer fails to make an advance, the indenture trustee must make the advance in its place, if deemed recoverable. These requirements for advances serve as a form of liquidity for the notes.

The manager may also direct the indenture trustee to make interest advances on the notes if the funds are deemed recoverable. The advances are meant to cover any shortfalls resulting from timing mismatches because of missed lease payments and any interest shortfalls. This requirement excludes make-whole amounts, post-ARD additional interest, and deferred post-ARD additional interest. These requirements for advances serve as a form of liquidity for the notes; however, we do not rely on advances in our cash flow projection.

S&P Global Ratings' Stress Scenario Assumptions

To determine the appropriate preliminary ratings for the series 2023-1 notes, we analyzed the transaction's cash flows utilizing stress assumptions derived in part from our criteria for rating single-tenant real estate triple-net lease-backed securitizations. We ran various cash flow scenarios to test the transaction's sensitivity to changes in default timing, given the transaction's credit enhancement (see "Methodology And Assumptions For Rating North American Single-Tenant Real Estate Triple-Net Lease-Backed Securitizations," published March 31, 2016).

In our opinion, the risk to the cash flow generated from the portfolio of data centers and their associated leases can be attributed to the following major factors:

- Defaults of the initial pool of tenants (the lessees);
- The property manager's ability to fill the vacant space at a comparable lease rate upon a lessee default or lease expiration;
- The lease terms for new tenants (rental rate and lease term);
- The credit profile of new tenants; and
- The liquidation value of the data centers toward the legal final maturity of the transaction.

We made the following primary modifications to our triple-net lease criteria to address the differences between triple-net leases and wholesale data center leases, as well as the data centers' relative lack of performance history:

- We did not assume any lease acceptance in the bankruptcy proceedings for defaulted tenants, given the lack of historical observations of defaulted wholesale data center tenants.
- We did not assume property liquidations until the 12-month window before the transaction's legal final maturity as we typically would for triple-net leases because the data centers are multitenant occupied. We believe it would likely be more economical for the manager to continue operating the centers rather than liquidate them, even during periods of high vacancy rates.
- For tenants not rated by S&P Global Ratings, we assumed a 'CCC-' rating rather than the typical 'B' rating specified in the triple-net lease criteria. This assumption reflects the lack of performance data for the wholesale data sector.
- Given the limited eligibility requirements for future tenants' credit quality, we assumed that by the start of our second default wave the tenant pool will have migrated from its current average credit quality of 'A+' down to an average credit quality of 'CCC-'.
- Given the limited history of wholesale data lease rates and the uncertainty around future supply and demand conditions, we applied re-lease haircuts for both performing and defaulted leases that are consistent with those that are one rating category above the haircut rates specified in the triple-net lease criteria. For example, at the 'A' category, we would assume a 20% loss in rental income upon lease renewal for a performing lease rather than the 15% specified in the criteria. Similarly, at the 'A' category, we would assume a 35% haircut to re-lease rental rates post-default for defaulted leases rather than the 30% specified in the criteria.

We applied two waves of default and used S&P Global Ratings' CDO Evaluator to determine the initial collateral pool's scenario default rate, with the following assumptions:

- The issuer credit rating by S&P Global Ratings on the initial lessee for the first default wave, or 'CCC-' for unrated lessees;
- 'CCC-' for the entire portfolio for the second default wave;
- The allocated collateral value per lease, calculated as each lease's total remaining scheduled payments;
- The current remaining terms of the leases; and
- The higher of portfolio default rate and the largest obligor default rate.

We determined the portfolio's property liquidation value using our commercial real estate methodology (see "CMBS Global Property Evaluation Methodology," published Sept. 5, 2012). We assumed rental income based on the in-place leases, the appraiser's estimate of market rent, and recent leasing data from the market and then applied a vacancy deduction to the potential gross income. We estimated expenses and expense reimbursements based on information from the appraisal reports and comparable properties. These expenses included fixed items such as real estate tax and insurance, estimated management fees, and variable expenses, which were reimbursed in our income projections. We determined net cash flow after deducting estimated leasing commissions, tenant improvement expenses, and capital reserves and expenditures, based on projected lease roll assumptions. We selected direct capitalization rates based on factors such as appraisal and market capitalization rates, property performance and tenant strengths, and property location.

Table 4 shows a summary of stress assumptions.

Table 4

Cash Flow Assumptions

Stress level	A-	BBB(ii)
Standard scenario default rate		
Portfolio scenario default rate (default wave 1) (%)(i)	9.5	7.1
Portfolio scenario default rate (default wave 2) (%)(i)	96.1	94.8
Largest-obligor test		
Portfolio scenario default rate (default wave 1) (%)(i)	11.2	9.0
Portfolio scenario default rate (default wave 2) (%)(i)	95.9	93.9
Non-defaulting leases		
Lease rate credit upon renewal (%)	81.7	85.0
Defaulting leases		
Accepted in bankruptcy (%)	0.0	0.0
Rejected in bankruptcy and re-leased (%)	100.0	100.0
Re-lease lag (months)	12	12
Lease rate credit (%)	66.7	70.0
Liquidation proceeds ($)	1,883,438,847	1,883,438,847
FX-adjusted liquidation proceeds ($)	1,788,846,227	1,809,538,363

(i)We select the higher of the standard default rate and the largest-obligor test for each wave. (ii)'BBB' level stresses are relevant for the series 2019-2 class B notes. FX--Foreign currency.

Cash Flow Analysis

To determine whether the available credit support is sufficient to withstand the assumed losses, we examined various simulated cash flow scenarios. In each scenario, the cumulative effects of the assumptions we detailed above were applied with four default timing curves in two default cycles (curves 1-4, see table 5), where the first default wave starts in year one, the second default waves starts in year 16, and final liquidation starts one year before the legal final maturity of the existing series 2019-1 class A-2 notes.

Table 5

Default Curves

Year	Curve 1 (%)	Curve 2 (%)	Curve 3 (%)	Curve 4 (%)
1	40	10	10	15
2	10	10	10	15
3	10	10	10	15
4	10	40	10	15
5	10	10	10	15
6	10	10	10	15
7	10	10	40	10

In each scenario examined, assuming the maximum commitment of $375 million on the VFN, the notes pay timely interest and full principal by their rated final maturity, and there were no deferred expenses (priority, operating, or maintenance capital expenses). Although the transaction documents require the servicer or indenture trustee to make advances on interest payments (if deemed recoverable), no advances were assumed in the cash flow modeling scenarios.

Sensitivity Analysis

Assuming a base-case scenario in which we assumed contractual cash flows with no losses and one renewal at the same lease rate following the initial lease term, we ran several break-even cash flow runs to measure the transaction's ability to withstand decreases in revenue or increases in expenses.

Sensitivity run 1: gross revenue reduction stress

We found that the transaction could withstand a 23% reduction in monthly gross revenue and still pay timely interest and full principal by the rated final maturity.

Sensitivity run 2: maintenance capital expense stress

We found that the transaction could withstand a 7.0x increase in monthly budgeted maintenance capital expenses and still pay timely interest and full principal by the rated final maturity.

Sensitivity run 3: priority expense, operating expense, and maintenance capital expense stress

We found that the transaction could withstand a 9% annual escalation of priority expenses, operating expenses, and maintenance capital expenses (instead of the 2% assumed in the rating scenario) and still pay timely interest and full principal by the rated final maturity.

Events of Default

Under the transaction documents, each of the following constitutes an event of default:

- A failure to pay timely interest on class A (and existing class B) notes;
- A failure to pay principal on any notes by legal final maturity;
- A failure to pay any other amount, to the extent that on the payment date there are funds available in the transaction accounts;
- A failure to comply with financial reporting requirement;
- A failure to comply with the covenants in the indenture or transaction documents;
- A material breach of the representations or warranties;
- The issuer being subject to involuntary bankruptcy proceedings;
- The issuer initiating voluntary bankruptcy proceedings;
- A change of control resulting in the specified tenant's lease termination; or

- The guarantor ceasing to own 100% of the issuer, or the issuer ceasing to own 100% of any asset entity.

Legal Matters

We expect the issuers' special-purpose entity (SPE) provisions to be consistent with our bankruptcy-remoteness criteria. In rating this transaction, we will review the legal matters that we believe are relevant to our analysis, as outlined in our criteria.

Surveillance

We will maintain active surveillance on the rated notes until the notes mature or are retired. The purpose of surveillance is to assess whether the notes are performing within the initial parameters and assumptions applied to each rating category. The transaction terms require the issuer to supply periodic reports and notices to S&P Global Ratings for maintaining continuous surveillance on the rated notes.

Related Criteria

- Criteria | Structured Finance | ABS: Advance Notice Of Proposed Criteria Change: Data Center Securitizations, Jan. 18, 2023
- General Criteria: Environmental, Social, And Governance Principles In Credit Ratings, Oct. 10, 2021
- Criteria | Structured Finance | General: Global Framework For Payment Structure And Cash Flow Analysis Of Structured Finance Securities, Dec. 22, 2020
- Criteria | Structured Finance | Legal: U.S. Structured Finance Asset Isolation And Special-Purpose Entity Criteria, May 15, 2019
- Criteria | Structured Finance | General: Counterparty Risk Framework: Methodology And Assumptions, March 8, 2019
- Criteria | Structured Finance | General: Incorporating Sovereign Risk In Rating Structured Finance Securities: Methodology And Assumptions, Jan. 30, 2019
- Criteria | Structured Finance | General: Foreign Exchange Risk In Structured Finance--Methodology And Assumptions, April 21, 2017
- Criteria | Structured Finance | ABS: Methodology And Assumptions For Rating North American Single-Tenant Real Estate Triple-Net Lease-Backed Securitizations, March 31, 2016
- Criteria | Structured Finance | General: Global Framework For Assessing Operational Risk In Structured Finance Transactions, Oct. 9, 2014
- General Criteria: Global Investment Criteria For Temporary Investments In Transaction Accounts, May 31, 2012
- General Criteria: Principles Of Credit Ratings, Feb. 16, 2011

Related Research

- Economic Outlook U.S. Q1 2023: Tipping Toward Recession, Nov. 28, 2022
- Credit FAQ: How U.S. Data Centers Are Navigating Inflation And Recession Risks, July 21, 2022
- ESG Credit Indicator Report Card: Real Estate, Dec. 14, 2021
- Field Of Data Streams: If You Build It, They Will Come, Sept. 20, 2019
- Cloud Disruption: Cloud Adoption And Digital Transformation Are Positives For The Data Center Industry, Sept. 7, 2018
- Despite Continued Growth, U.S. Data Centers May Face Long-Term Risks From Financial Pressures And Uncertain Tech Developments, Oct. 30, 2017
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- Credit FAQ: Analyzing The Real Estate Characteristics Of Data Centers, July 25, 2016