

# Kellogg-Morgan Stanley Sustainable Investing Challenge

## Gigabyte Real Estate Environmental Trust (GREEN REIT)

World's data centers emit as much CO2 as the global aviation industry. Our REIT targets a new and impactful asset class – Green Data Centers. Our proposal finances transitions to sustainable buildings in Asia Pacific and accelerates innovation in green data center design and operation. These practices reduce negative environmental impact caused by data center operations and drive environmental sustainability for both technology and real estate sector.

## Challenges

A single data center can use power equivalent to a small city and requires significant amount of water for cooling. As COVID-19 pandemic has triggered an unparalleled acceleration in digital transformation, data centers will have the fastest-growing carbon footprint within the IT sector. It is predicted that the energy consumption of data centers is set to account for **14%** of the world's carbon emissions. The number of data centers worldwide has grown from 500,000 in 2012 to more than **8 million** today. Furthermore, the amount of energy used by data centers continues to double every four years and 30% of the hyperscale data centers are in Asia Pacific. Yet, 70% of the data centers do not use any efficiency metrics, indicating a lack of awareness and incentives, and the capital market is far too passive in promoting green data centers.

## Product Details

|                               |  |
|-------------------------------|--|
| Unitholder's Fund             | \$725M   |
| Gearing Ratio                 | 40%  |
| Total Assets                  | \$1.25B  |
| Listing                       | Singapore Stock Exchange   |
| Target Property Yield (%)     | 6% - 8%  |
| Target Distribution Yield (%) | 4% - 5%  |
| Geography                     | Asia Pacific, with focus on Greater China and South-East Asia              |
| Target Investors              | Family Offices, Private Banks, SWF, Individual Investors with Impact Focus |
| Asset Class                   | Data Centers   |

## Impact Metrics & Contributions

| Higher Energy Efficiency  | Better Environmental Protection  | Smart & Green Innovation   | Key Impact Estimation over Ten Years   |
|---|--|--|--|
| <ul style="list-style-type: none"> <li>- Power Usage Effectiveness (PUE &lt; 1.60)</li> <li>- Cooling System Efficiency e.g., Liquefied natural gas as a source for cooling energy; utilizing seawater; underground locations</li> <li>- Use of Renewable Energy</li> </ul> | <ul style="list-style-type: none"> <li>- Data Centre Design and Energy Management e.g., Modernizing IT infrastructure</li> <li>- Water Efficiency</li> <li>- Green Products and Materials</li> <li>- Sustainable Construction</li> </ul> | <ul style="list-style-type: none"> <li>- Data Center Infrastructure Management</li> <li>- Other Green Features &amp; Innovations e.g., Adopting 'smart' approaches and AI to identify where energy can be reduced</li> </ul> | <ul style="list-style-type: none"> <li>➤ 320,000 MW Energy Savings = power for 240,000,000 California homes</li> <li>➤ 128,000 tons of CO2 emissions reduced = 64 million trees planted</li> </ul> |

## Scalability & Addressable Market

The GREEN REIT model is scalable globally with a large addressable market. As the end of 2019, the **total market capitalization of all publicly traded REITs in Singapore was S\$111.9 billion**. According to research, the top 10 global investors allocated on average 18.9% of their overall portfolios towards real estate in 2019. In terms of scalability, there are two key factors that contribute to it. Firstly, the underlying asset is growing rapidly. **It is anticipated that the global data center construction market size will reach \$121.56 billion by 2027**, expanding at a CAGR of 8.5% from 2020 to 2027. Coupled with the growing need to go green, this provides the GREEN REIT an increasing number of quality pool of assets to invest in. Secondly, the open-ended REIT structure makes it easily accessible to investors worldwide. Given **investors' high interest to participate in the secular trend as shown by the jump in data center themed stocks/ETFs (NYSE:SRVR +58% since 2019)**, it is believed that GREEN REIT will enjoy high liquidity allowing the asset size to scale in a healthy and sustainable manner.

## Solution & Impact

The creation and promotion of green and sustainable data centers that commit to green power, sustainable construction and management, have become urgent and essential. With our Gigabyte Real Estate Environmental Trust (GREEN Trust), we will address the problems by:

- Introducing a new asset class – **Green Data Centers**, certified by LEED or Green Mark Building Assessment
- Attracting a wide base of individuals and institutional investors and **channel more funding** into building green data centers
- Raising awareness on the environmental impact of data centers – **200TWh electricity consumption, 900 billion kilograms of CO2 emission**
- Incentivizing **property developers and IT companies** to build more GREEN data centers and reduce carbon emissions

## Investor Appeal & Innovative Elements

### ➤ Reduce Climate Transition Risk Exposure

Traditional REITs greatly expose investors to climate transition risk due to high carbon emission by the real estate industry. This is alleviated by GREEN REIT as the product only invests in certified green data centers recognized by local governments.

### ➤ Provide Attractive Investment Return

Available green investment products in Asia public markets are mostly low-yield bonds (<3%) with no capital gain. Meanwhile, GREEN REIT's data centers benefit from the secular growth of cloud solutions and AI, and consequently generates attractive yield and capital gain for the investors.

### ➤ Improve Impact Transparency

Currently, investors have little information on the use of proceeds raised through most green investment products, particularly green bonds. But with GREEN REIT, proceeds raised will only be used to invest in Green Mark or LEED certified data centers. Auditing efforts by BCA (Singapore) or U.S. GBC authorities can help investors monitor the water and energy efficiency of their property investments in a consistent and convenient manner.

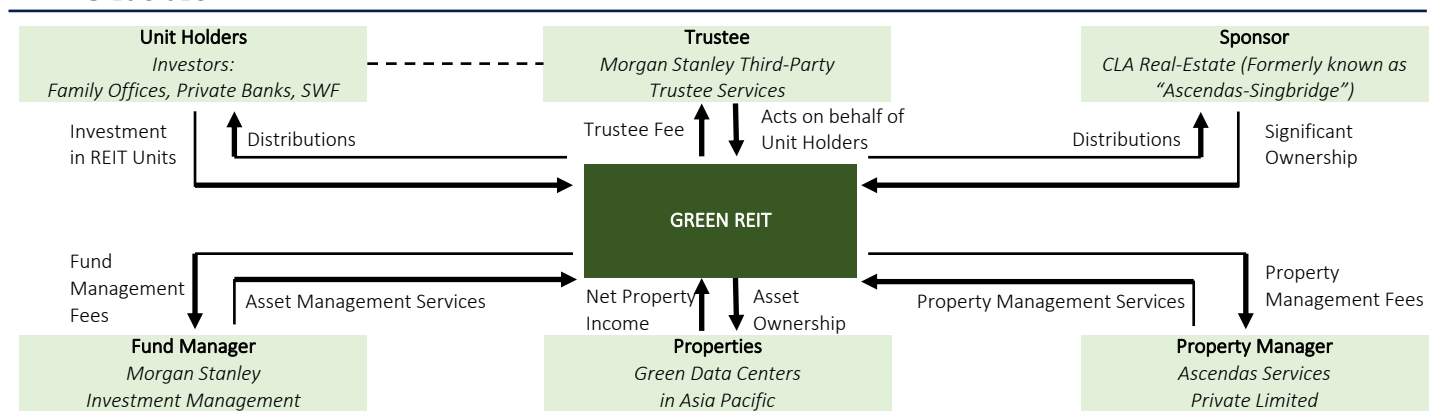
## LEED/Green Mark Building Assessment

**US LEED®** (Leadership in Energy and Environmental Design) is a sustainability ratings system that has been used globally, especially in North America and Western Europe, with some projects in Asia. While **Green Mark** is developed by the Singapore BCA (Buildings & Construction Authority) and is considered as the tropics' answer to LEED. It has been adopted in Singapore, with certified projects in Indonesia, Malaysia, Thailand and China.

- **LEED** has developed a Reference Guide for Building Design and Construction: Data Centers, with credit categories in energy efficiency, cooling efficiency, power system and green construction.
- **Green Mark** has also launched a dedicated green building rating system for Data Centres. The criteria consist of 5 environmental impact categories: Energy efficiency, Water efficiency, Sustainable Construction & Management, Smart & Healthy building, and Green innovation. Both certifications have 4 levels of ratings from Certified to Platinum (highest). **Our REIT will only select green data centers that meet LEED/Green Mark Gold and above ratings for higher energy efficiency and impact.**

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## REIT Structure

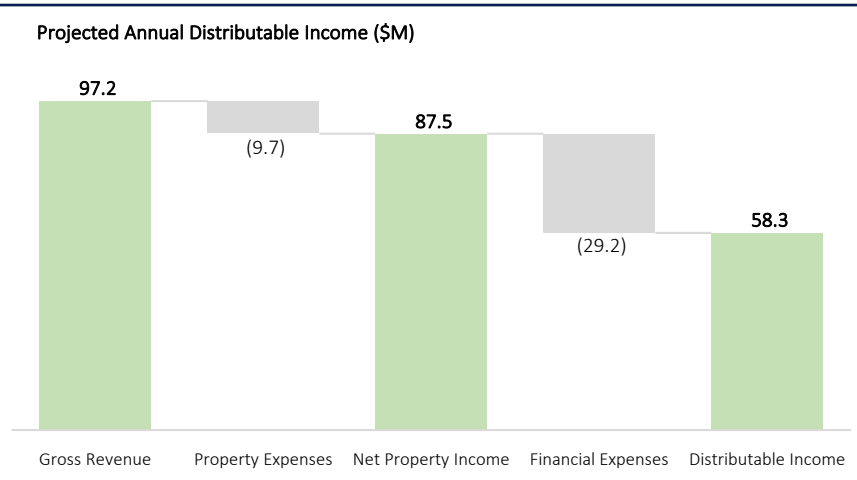


## Representative Portfolio Properties

| Property Name                         | Estimated Valuation | Location  | LEED/ Green Mark      | Property Description  | Green Performance  |
|---------------------------------------|---------------------|-----------|-----------------------|---|--|
| Zhong Yunxin Shunyi Cloud Data Center | \$385M              | China     | LEED: Gold            | 430,400 sq ft hyperscale data center that host 8000 Uptime Tier 4 grade cabinets.                             | 2019 APAC EnergySmart Award finalist; Artificial Intelligence (AI)-enabled thermal control and cooling system with a Power Usage Effectiveness (PUE) value of less than 1.50.        |
| Telin-3                               | \$155M              | Singapore | Green Mark: Platinum  | A 215,278 sq ft five-storey multi-tier data center in the Singapore Data Centre Park (DCP) opened in 2016.    | Low envelop thermal transfer value (ETTV) building design; Energy efficient chilled water plant; At least 99% potable water savings with NEWater and efficient Cooling Tower design. |
| 1-Net North                           | \$145M              | Singapore | Green Mark: Gold Plus | A 200,000 sq ft five-story telco-class carrier neutral internet data centers.                                 | Modular hibernation technology saving >10 million kWh of electricity over ten years; Software optimization improves energy consumption by >10%.                                      |
| Pacnet SG CloudSpace 2                | \$90M               | Singapore | Green Mark: Gold Plus | A 155,000 sq ft data center capable of supporting 1,500 high-power density racks with IT load of 6 megawatts. | Transformer efficiency >98%; Power Usage Effectiveness (PUE) at 1.43, equivalent to energy saving of 28.5%.  |

## Key Projected Financial Metrics

|                                    |                 |
|------------------------------------|-----------------|
| Deposited Properties               | \$1,250,000,000 |
| Unitholder's Funds                 | \$725,000,000   |
| Leverage Ratio                     | 40%             |
| Initial NAV per Unit               | \$1.00          |
| Target Net Property Income (NPI)   | \$87,500,000    |
| Implied Average Property Yield (%) | 7.00%           |
| Target Distribution per Unit (DPU) | 8.046 cents     |



## Risks and Mitigation Strategies

- **Sustainability Risk**  
Over the fund's lifetime, only data centers with LEED/Green Mark certification above Gold is selected. Should the property not adhere to the standards or fail to renew upon expiry, the fund will divest the property within 12 months to ensure sustainability standards of the GREEN REIT.
- **Market Risk**  
The fund will examine buildings' rental yields, price per foot, major capital expenditures, weighted average lease expire (WALE), occupancy rate and depreciation schedules to model and project the property yield to manage the market risk in a timely manner.
- **Interest Rate and Currency Risk**  
The manager constantly monitors its exposure to changes in interest rates for its interest bearing liabilities. The fund's foreign currency risk is hedged by borrowing in the currency of the country of investment.

## Strategic Partners: Public-Private-Partnership

- **CLA Real Estate Holdings** (formerly known as "Ascendas-Singbridge") is a provider of sustainable urban development and business space solutions with assets under management of over S\$20B in Asia. It currently owns >20 high-specs industrial and data centers in Singapore. It merged with CapitaLand in 2019 to form the one of Asia's largest real estate group.
- **Singapore Ministry of Sustainability and the Environment** has launched a Singapore Green Plan 2030 that will be a major policy priority for the Government for public-private-partnership in sustainability developments. This strengthens Singapore's commitments under UN's 2030 Sustainable Development Agenda and Paris Agreement.
- **China's Greater Bay Area Development Plan** and **Singapore's Smart Nation Strategy** accelerate growth of technology start-ups in Asia, driving strong demand for high performance data centers to support the infrastructure needs for a high-tech ecosystem.