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In 2023, Natixis won The Banker's ***Investment Bank of Year for Sustainability-Linked Loans Award***, the ***ESG Infrastructure & Energy Bank Award*** from IJ Global, the Environmental Finance ***Impact Investment Bank of the year award,*** and the IFR ***ESG Insight Award.***

Investor feedback – Sustainability considerations for data centers

October 2024

GROUPE BPCE

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01 Sustainability Considerations in the data centers' sector

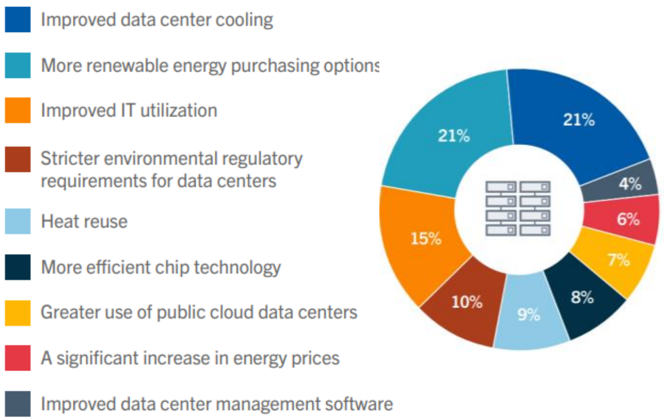
A Growth in Data Center Efficiency

But more effort is needed in the coming years

Over the past few years, substantial progress has been made on **data centers' power efficiency**: as internet traffic surged and data center workloads tripled, the increase in energy use was significantly lower thanks to improvements in IT hardware, cooling and the shift towards more efficient cloud and hyperscale data centers[1]. While this outcome is welcome, continued improvements are required to further reduce the absolute increase in absolute emissions, as the need for data centers is projected to grow.

1 Data centers have used multiple levers to reduce their environmental impact

Drivers of sustainability gains for data centers[1]



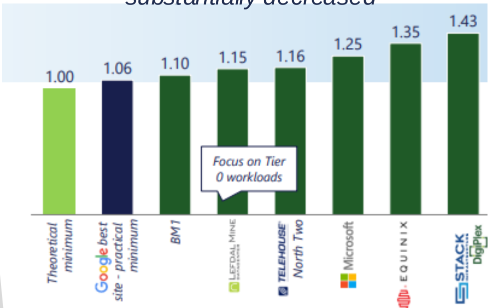
(All figures rounded)

Global trends in digital and energy indicators (2015-2022)[2]

	2015	2022	Change
Internet users	3 billion	5.3 billion	+78%
Internet traffic	0.6 ZB	4.4 ZB	+600%
Data centre workloads	180 million	800 million	+340%
Data centre energy use (excluding crypto)	200 TWh	240-340 TWh	+20-70%
Crypto mining energy use	4 TWh	100-150 TWh	+2300-3500%
Data transmission network energy use	220 TWh	260-360 TWh	+18-64%

2 Material progress on PUE

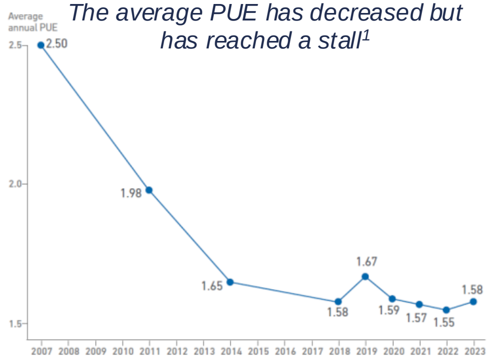
The design PUE of new data centers have substantially decreased



CLIMATE NEUTRAL DATA CENTER

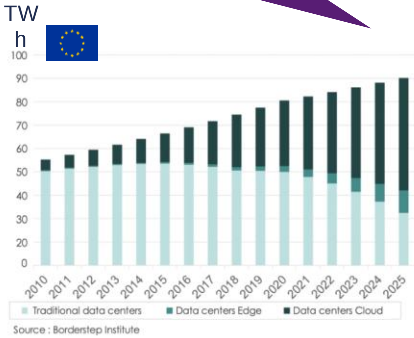
- By 2025, new DCs operating at full capacity in **cool climates** shall meet an annual PUE target of 1.3. New DCs operating in warm climates at full capacity shall meet an annual PUE of 1.4.
- Existing DCs shall achieve these same targets by 2030[3]

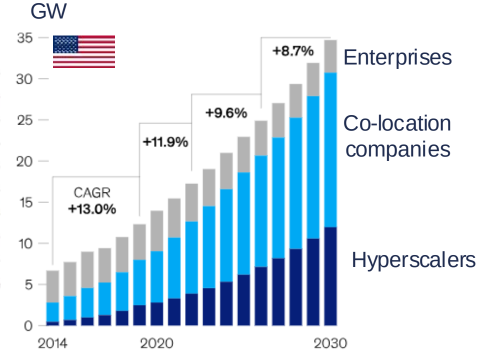
The average PUE has decreased but has reached a stall[1]



3 But global data center demand is forecasted to grow[4,5]

Creating a "rebound effect"





Therefore, to counter the environmental impact due to data center expected growth, we recommend to:

Continue **increasing energy efficiency** of data centers (existing and new) using existing drivers

Increase the use of renewable energies

1. Sustainability Considerations in the data centers' sector

Sources: 1. Uptime Institute Global Data Center Survey, 2023
2. International Energy Agency, Global Data Centres Survey, 2023
3. Climate Neutral Data Center Pact, Self-Regulatory Initiative, 2023
4.Carbone 4, Global Carbon Footprint: Do Amazon, Microsoft and Google have their head in the clouds?, 2022
5. McKinsey, Why Invest in the rising data center economy, 2023

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Sustainability Considerations for Data Centers

How their associated sustainability impacts are treated by the sustainable finance market

According to a McKinsey report, a **foreseeable and sizeable development of the market for Data Centers is expected in the coming years** due to **growing demand** stemming from cloud services, digital transformation initiatives and the rising volume of data generated by businesses and consumers[1]. However, data centers are not green "by default": data centers and data transmission networks are responsible for 1% of energy-related GHG emissions. Moreover, the sector is deemed to require "more efforts" to reach climate targets[2].

1 Identified sustainability impacts

Below are the main sustainability categories to be evaluated when analyzing the construction and the operation of a data center.

Environmental considerations

Cooling

- Data center equipment needs to be cooled to work efficiently. **Cooling accounts for around 40% of a data center's energy consumption**[1]. The refrigerant gases used for this purpose have a high global warming potential.

Energy Consumption and Energy source

- On average, a **facility consumes 20-50 MW**, equivalent to the electricity consumption of 15,000-37,000 homes)[3]
- The average size of DCs is forecasted to increase, with new facilities reaching 300MV.
- The **carbon intensity** of the energy source is a key component of DC's environmental impact as it directly affects CO_2 emissions. Using renewable energy generates less emissions than using the local energy grid, which in turns minimizes the environmental impact.

Water usage

Traditional cooling methods are highly water-intensive: a 1MW data center is estimated to use upwards of 26 million liters of water each year[4].

E-waste

Use of rare or non-recyclable metals to build the data centers components (servers etc..).

Heat waste

Because of the amount of processing power data centers use, an excessive amount of heat is generated.

Social considerations

Noise

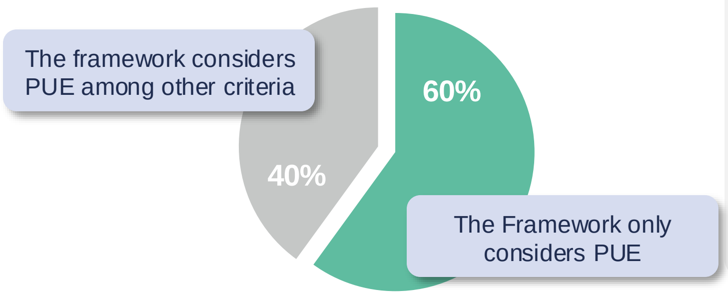
People leaving near data centers may experience continuous noise (up to 96 dB) from HVAC systems or generators.

Increased utility bills for local community

Transmission &/or Distribution line investments are sometimes needed to support the energy needs of larger data centers. However, in certain regions such as in Virginia, US, the cost related to new transmission lines is covered by ratepayers who do not receive a net benefit.

2 However, to date the sustainable finance market seems to focus solely on power usage efficiency (PUE) to assess the "greenness" of a data center

Sustainable financing frameworks with reference to data centers[5]



- Out of 10 sustainability financing frameworks which referred to data centers in their eligible categories, **only 4 considered other metrics than PUE.**
- **PUE** also seems to be the main metric considered by the SPO Providers to assess a data center's sustainability. However, only using one indicator (compared to the numerous environmental risks mentioned above) reflects a limited part of the impact a data center has.
- Achieving a PUE below the threshold of **1.5** is considered "credible" and "impactful" by most SPO providers.
- However, compared to the global market average of 1.55[6], a PUE of 1.5 is still considered high.
- Given PUE is heavily influenced by **local climatic conditions**, it would be more relevant to consider localized PUE thresholds to identify "best-in-class" (e.g., top 15% in a region).

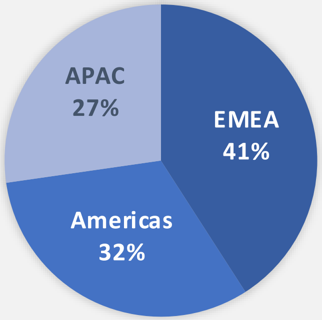
Source: 1. McKinsey, Investing in the rising data center economy, 2023
2. International Energy Agency, Data Centres and Data Transmission Networks, 2023
3. Data Centre Magazine, Energy efficiency predictions for data centres in 2023, 2022
4. Sensorex, Data Center Water Usage Challenges and Sustainability, 2022
5. Natixis analysis based on LGX Datahub data, as of 1 February 2023
6. Uptime Institute, Global Data Survey, 2022

02 Results of the survey

Sustainability consideration for Data Center: Investors Survey overview

We have conducted a series of 22 global and diversified investor meetings between June and July 2024 with:

- **Credit Analysts and Portfolio Managers, and**
- **ESG specialists**



Investors by region

Respondents' profiles:

- Focus on global Nonbanking Financial Institutions (NBFIs).
- Total cumulated AuM of € 13,243 bn *
- Investing in Data Centers (be public and private debt, including securitization).
- Focus on infra. debt investors.
- Active DCs lenders

2. Results of the survey

Key questions asked:

- **Are you investing in DCs ?**
- **Do you have a sectoral policy / specific ESG requirements when investing in DCs ?**
- **Are you actively monitoring sustainability metrics** (beyond what is being required by regulation) ? (e.g., energy consumption and cooling, renewable energy supply, water usage, heat waste recycling, social aspects, etc.). And if appropriate, **have you set minimum / binding thresholds to invest in DCs ?**
- **Do you consider the EU Taxonomy in your investment decision process ?**
- **Do you have more specific ESG requirements to include DCs in dedicated sustainable funds / mandates** (such as EU SFDR art. 8 and 9 funds) ?
- **Do you have a particular appetite for sustainable finance instruments** (be it Green Loans or Sustainability Linked Loans instruments) ?

1. Results of the survey

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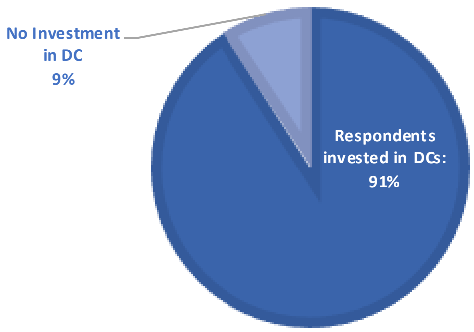
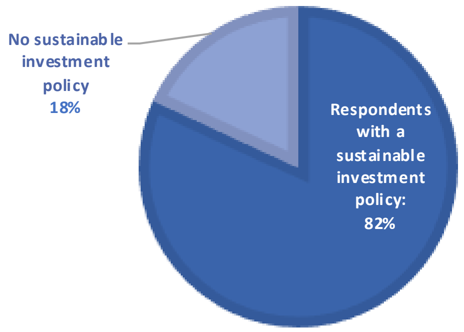
General comments

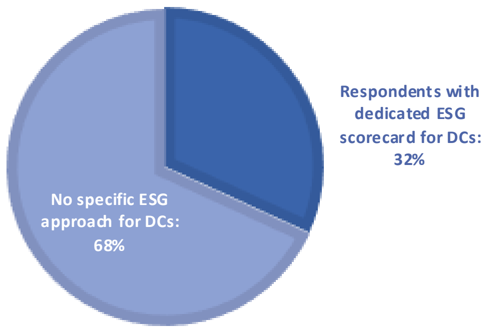
Investment in DCs



Sustainable investment policy



ESG approach for DCs



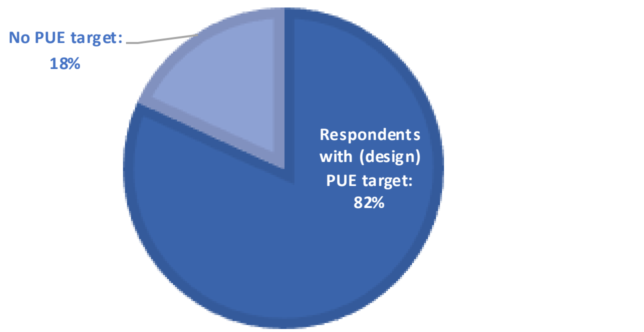
- ► **All respondents invest or intend to invest in data centers (DCs)**.
- ► **Some investors have been significantly investing in DCs for years and have developed real sustainability expertise on the sector**.

- ► Almost **all respondents** (18/22) **have a sustainable investment policy** (otherwise, they are at least paying attention to the due diligences carried out within the framework of the IFC Equator Principles).
- ► But **only 1/3 have develop a specific ESG approach and/or scorecard for the Telecom sector and DCs**.

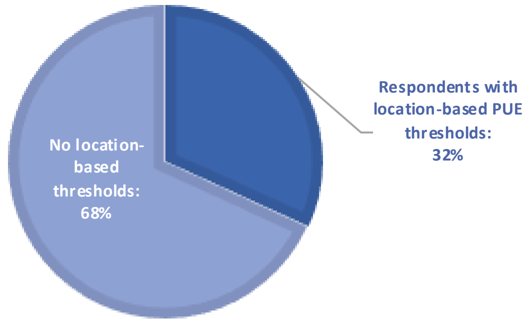
- ► **Energy consumption is key to all respondents**, with or without an ESG expertise. **Energy supply and the use of renewable energy**, and **water usage for cooling**, are carefully monitored by “green-driven” investors.
- ► **Investors ask for ESG or sustainability-related covenants in private credit** to improve the management of sustainable mandates/funds, and ease clients and their own regulatory reporting obligations.

Energy consumption

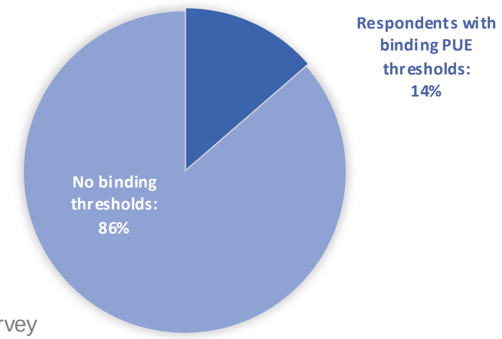
PUE target



Location-based PUE thresholds



PUE binding thresholds



- **Power Usage Effectiveness (PUE) is the most important criterion under consideration**.
- **PUE level is crucial for tenants' attraction/retention** and is **often asked at design stage** by hyperscale DCs sponsors. Beyond pure sustainability consideration, investors want to **invest in cutting edge technologies**, to **avoid investment in assets that could be considered "stranded"** in the mid to long term.
- **PUE targets:**
  - **Sweet spot ranging from 1.4 to 1.2** (in line with German Energy Efficiency Act (EnEfG) – quoted by many investors – which requires DCs that begin operations on or after July 1, 2026, must achieve a PUE of less than or equal to 1.2).
  - **1/3 of respondents consider DCs locations, refining their PUE targets accordingly** (to account local climate environment, regulatory requirements, energy mix of a country, etc.).
  - **Binding thresholds only for sustainable investment strategies** (SFDR art.8 and 9 funds) **so far.**
- Although it is an integral part of the energy consumption of a DC (about 40%), **the cooling system is less considered** (8/22), **as is the use of refrigerant gases** (2/22, even though the EU Taxonomy has set a threshold for its use in view of its global warming potential).

2. Results of the survey

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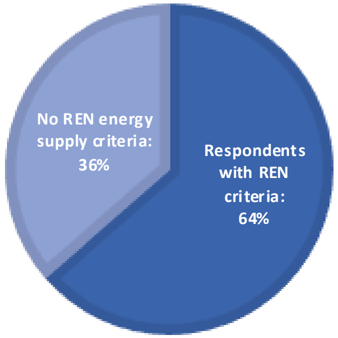
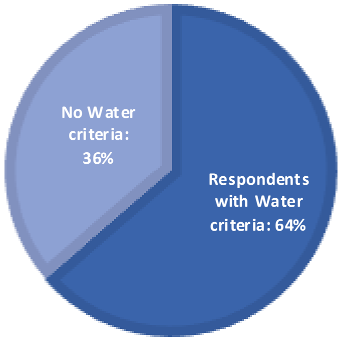
Energy supply, Water usage, and other sustainability criteria

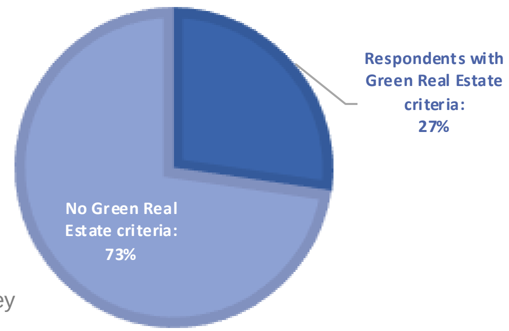
Renewable energy supply



Water usage



Green Real Estate certification



- **Energy supply and the use of renewable (REN) energy** are the second most common criteria under consideration (2/3 of respondents).
  - **RECs are becoming a must have, and direct REN PPAs a nice to have** (at least for the "green-driven" investors, 10/22).
  - **Pilot 24/7 carbon-free energy projects are gaining interest** (to tackle REN intermittency issue).
  - **Being autonomous in renewable energy production is seen as the holy grail** (to avoid load deferral on the grid, and potential carbon-based electricity).

- **Water usage for cooling is also seen as a big issue for 2/3 of respondents**.
  - **Especially in water stress areas** facing drought concerns (one respondent mentioned the exit of a DC project for which drinking water consumption had been underestimated…).
  - 3 investors mentioned **Water Usage Effectiveness (WUE) as a desirable KPI to monitor**.
  - **Zero water cooling systems or closed loop leading to WUE of 0 are also under consideration**.

- Other environmental criteria are:
  - **Green Real Estate certifications** (for 1/3 of respondents).
  - **E-waste management**.
  - **Biodiversity impacts.**

- **Social aspects**:
  - Several investors also pay **attention to DCs end-use**. They make clear distinction between professional/sensitive data storage they are eager to fund, vs recreational uses (TikTok and Netflix were quoted), or controversial activities (such as cryptocurrency market).
  - But also **impact on local communities** (e.g., thirsty Microsoft's DC in Middenmeer, NL; or recycling of heat generated by data centers).

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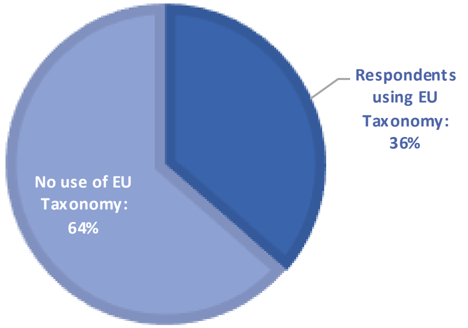
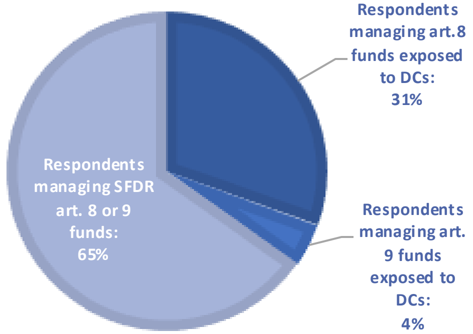
ESG data, ESG funds and Sustainable debt instruments

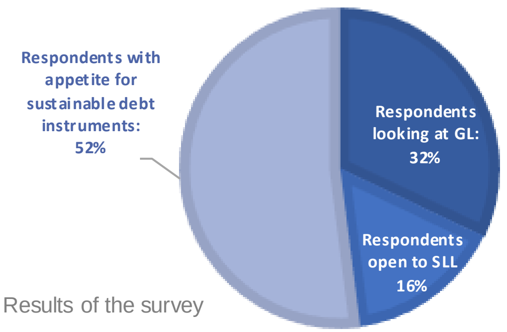
EU Taxonomy



EU SFDR art. 8 & 9 funds



Sustainable finance products' appetite



2. Results of the survey

- ► **Sustainable regulation pushes investors to request loans with ESG covenants**.
  - 1/3 of respondents (especially European investors) consider **EU Taxonomy as a benchmark**, but don't have alignment targets to date considering the difficulty to perform a full technical screening criteria (TSC) assessment.
  - **EU SFDR Principle Adverse Impacts (PAI) is driving ESG data disclosure** (8 KPIs are collected under Natixis GWF*). Indeed, the PAIs refer to the negative effects of investments on a given environment.
  - **Recall investors also need to produce a GIR** (Green Investment Ratio) **and have Net Zero targets**…
  - ► **1/3 of respondents manage sustainability funds exposed to DCs**:
  - 7 SFDR art. 8 funds
  - 1 SFDR art. 9 funds

  SFDR art. 8 funds, promote environmental or social characteristics (light green).

  SFDR art. 9 funds, have sustainable investment as their objective (dark green).

- ► **Sustainable debt instruments are gaining traction.**
  - **Considered as a nice to have to enhance transparency and improve E&S data collection**.
  - **Investors are more cautious when it comes to SLLs.** KPIs that increases or decreases a return is an issue for insurance clients. They need to take the worst case in their risk/reward targets; Generally speaking, investors are opposed to step down mechanisms.

* GWF data collection for DCs mirroring SFDR PAI template:
- Mandatory (5): carbon footprint, carbon intensity, share of non-REN energy, energy consumption intensity, biodiversity hotspot.
- Voluntary (3): water usage and recycling, natural species and protected areas, breakdown of energy sources.

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03 Market Data

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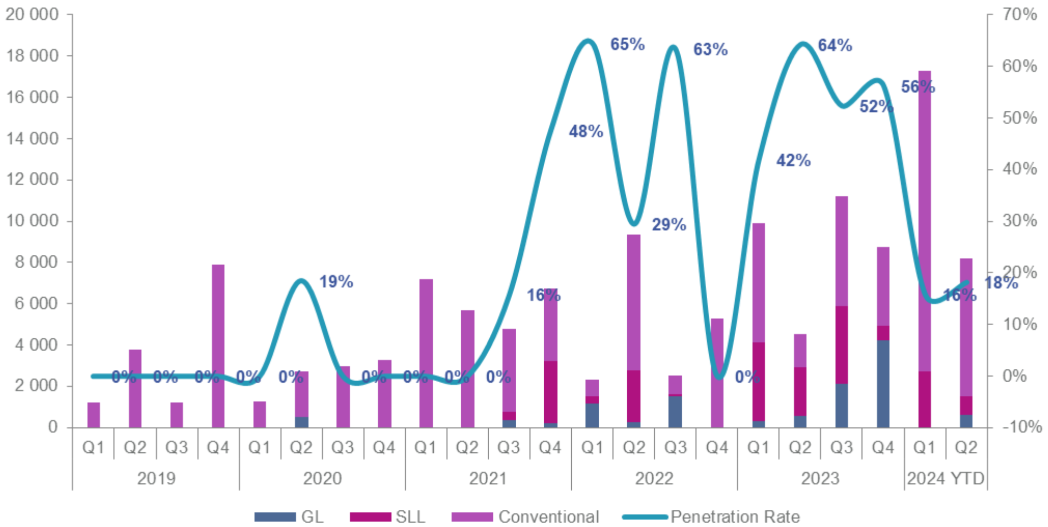
Data Center Sustainable Loan Market Data

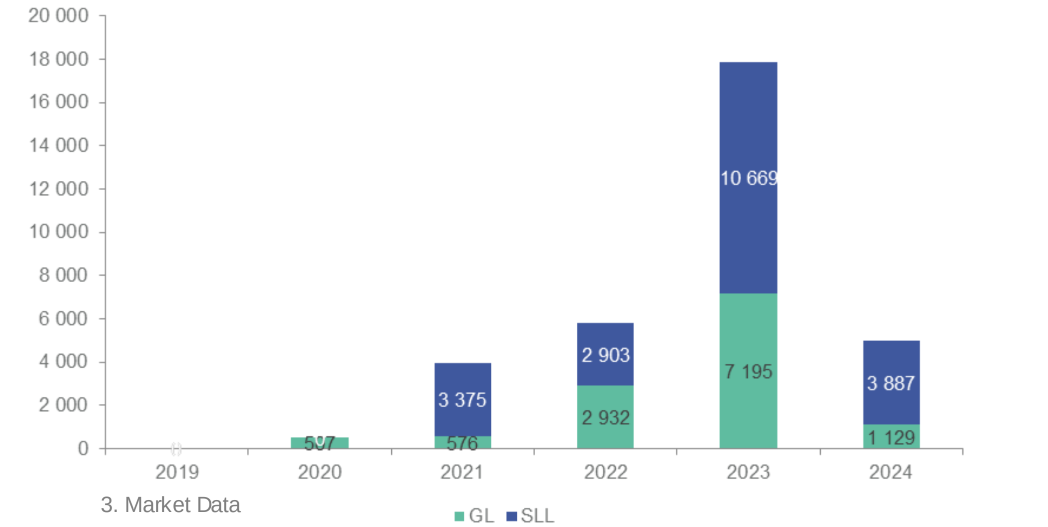
GSSS Loan penetration rate ($mn eq, %)



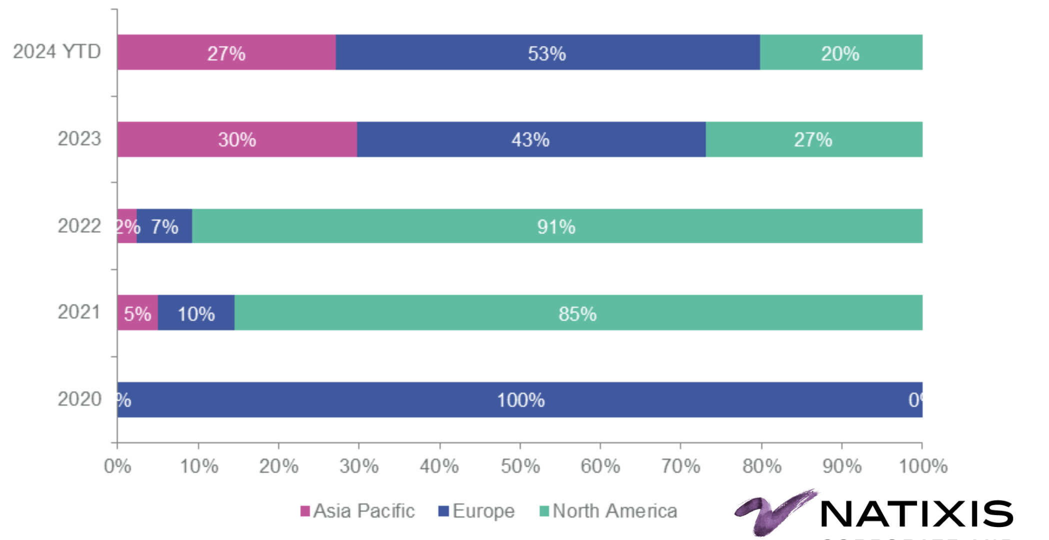
Largest GSSS Borrower

Rank #	Issuer Name	Issuances since 2020 nb	2020 $m eq.	2021 $m eq.	2022 $m eq.	2023 $m eq.	Total issuance volume since 2020 ($m eq.)
1	EdgeConneX	6			250	3,247	3,497
2	Airtrunk	11				3,042	3,042
3	Aligned	4		375	1,750		2,125
4	Virtus	4	507			1,467	1,974
5	Infrastructure Italia Land 6 srl	2				1,140	1,140
6	Compass Datacenters LLC	2			1,075		1,075
7	AtlasEdge Data	2				777	777
8	Strategic IDC Ltd	1				716	716
9	Nabiax	6		377		226	603
10	AE Group Holdco II Sarl	3				569	569
11	Asset Three SPC	1				429	429
12	TOK2 SPC	3			139	228	367
13	DCK One Co Ltd	3				346	346
14	NTT Global Data Centers AMS1 BV	2			320		320
15	PT	1				314	314
16	GDS IDC Services (Malaysia) Sdn Bhd	1				271	271
17	STT	2				200	200
18	Brookfield Ruby Finance Pty Ltd DCI NZ Operations LP	5		199			199
19	Cyllene SAS	5			78		78
20	Datong Qinhuai Data Co Ltd	3				77	77

Evolution of GSSS DC issuance ($mn eq)



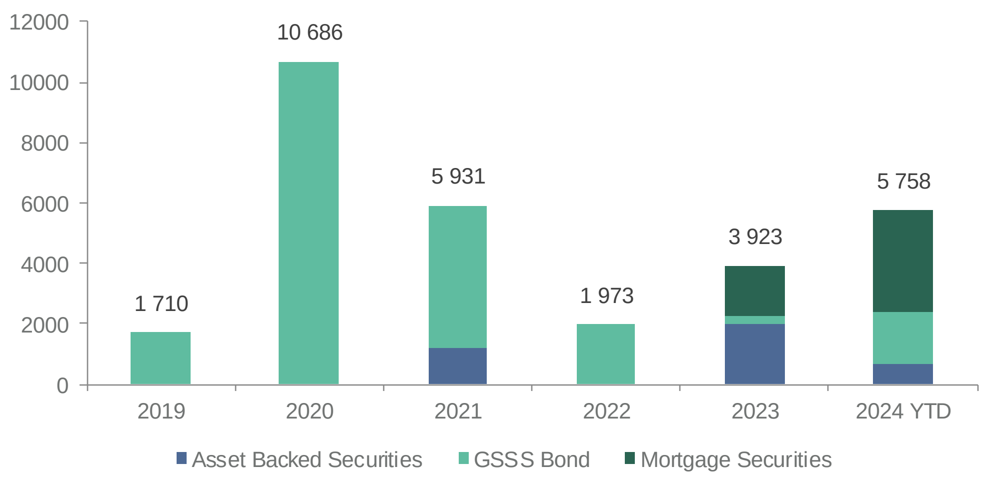
Evolution of GSSS Loans by region (%)



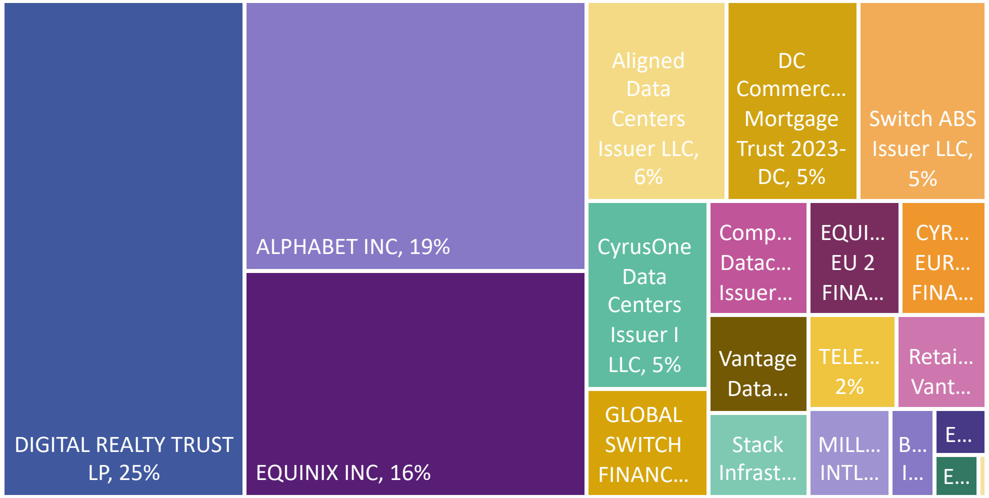
Natixis Green & Sustainable Hub, Market Data, Septembver 2024 (Source: Dealogic, Natixis)

Data Center Sustainable Bond and Securities Market Data

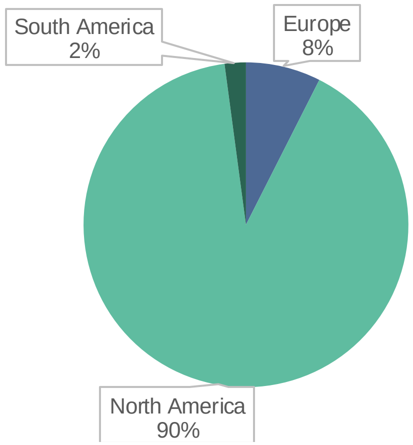
Evolution of GSSS issuances including securitization ($mn eq)



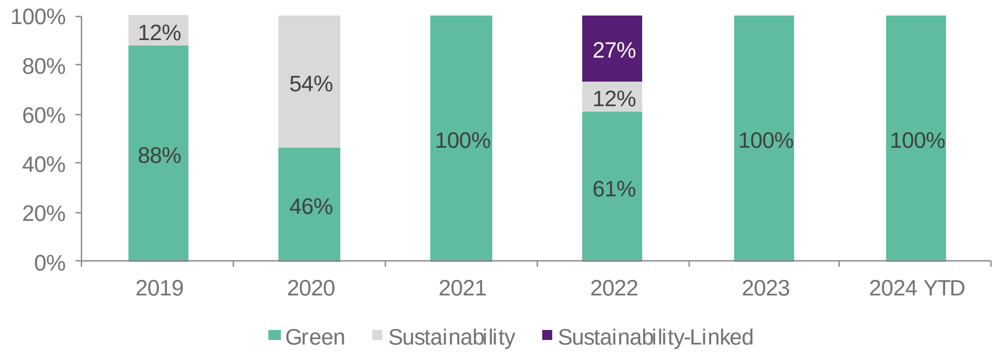
Largest GSSS issuers including securitization (%)



Breakdown of DC bond issuers' geographies



Evolution of bond issuances' type ($mn eq)



Study conducted on the following issuers : Aligned, Compass, CyrusOne, DC Commercial Mortgage, Teleperformance, Equinix, Millicom, Digital Realty Trust, Global Switch Finance, Alphabet, Verne Global (Ficolo OY), Bulk Infrastructure, EdgeConneX, Retained Vantage, Stack,

3. Market Data

Natixis Green & Sustainable Hub, Market Data (including Asset Backed Securities and Mortgage Securities), September 19th, 2024 (Source: Dealogic & Bloomberg)

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