What Smart Building Solutions Mean to Successful Sustainability Strategies
CORPORATE HOST:
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NMHC

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Vice President, Technology Solutions Architect
WSP

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Elme Communities

FIBER: PAVING THE ROAD TO OUR CONNECTED FUTURE
Analyze ESG risks & opportunities that could impact shareholder value

Regulations, energy prices, market preferences

Corporate Governance

Human capital management

Health & Safety

Property type and location

Company / Fund

Industry trends: domestic, regional, international

Corruption & Business Ethics

Business operation
- development
- management

Tenant

Lease type, tenant engagement and flexibility of use

Information Classification: GENERAL

Source: MSCI - https://www.msci.com/resources-for-issuers
Main Street

To operate in a way that has positive effects on society and the environment

Wall Street

To operate in a way that reduces risk and potential loss, creating and increasing value
Ratings Groups

- GRESB®
- SUSTAINALYTICS
- MSCI
- ISS
MSCI ESG RATINGS

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**MSCI**: A

**ESG Rating History**

- AAA
- AA
- A
- BBB
- BB
- CCC

**ESG Rating Distribution**

- Universe: MSCI ACWI Index constituents, Real Estate Management & Services, n=38

- 3% CCC
- 4% B
- 15% BB
- 23% BBB
- 21% AA
- 15% AAA

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**SUSTAINALYTICS**: “Low Risk”

**ESG Risk Rating**

- Score: 11.9
- Momentum: -5.0
- Updated: Feb 20, 2023

**ESG Risk Rating Distribution**

- Global Universe: 5411012
- Real Estate: 1371059
- REITs: 844159

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**ISS**: C-

**Distribution of ESG Corporate Ratings**

- 376 companies in the industry

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**Momentum**

- Low to High: updated Feb 20, 2023
Why is ESG Important?

39% of global energy related carbon emissions come from the built environment.

25 cities in the US have pledged to become carbon neutral by 2050.

A recent PwC survey indicates that more than 79% of investors believe that ESG-related risks are an important factor in investment decision-making.

Global ESG assets may surpass $50 trillion by 2025, one-third of the projected total assets under management globally.
REITs Reporting ESG Publicly

<table>
<thead>
<tr>
<th>Year</th>
<th>REITs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>60</td>
</tr>
<tr>
<td>2018</td>
<td>66</td>
</tr>
<tr>
<td>2019</td>
<td>84</td>
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<tr>
<td>2020</td>
<td>98</td>
</tr>
<tr>
<td>2021</td>
<td>100</td>
</tr>
</tbody>
</table>

Data based on 100 largest REITs by equity market capitalization.

Source: https://www.reit.com/investing/reits-sustainability/reit-esg-dashboard
A World of Agreement: Temperatures are Rising

Global Temperature Anomaly (relative to 1951-1980, °C)

Met Office Hadley Centre/Climatic Research Unit

Source: earthobservatory.nasa.gov/world-of-change/global-temperatures
More Scary Charts, Videos, and GIFS

NASA:
https://earthobservatory.nasa.gov/world-of-change/global-temperatures

NASA:
https://climate.nasa.gov/climate-resources/300/video-climate-spiral/

Scientific America:

NOAA:
BENCHMARKING & DISCLOSURE

REIT Assets with Environmental Performance Disclosure
(by equity market capitalization)

- **Carbon Emissions Disclosure**
  - 2017: 38%
  - 2018: 41%
  - 2019: 51%
  - 2020: 66%
  - 2021: 78%

- **Energy Usage Disclosure**
  - 2017: 33%
  - 2018: 42%
  - 2019: 51%
  - 2020: 66%
  - 2021: 71%

- **Water Usage Disclosure**
  - 2017: 30%
  - 2018: 35%
  - 2019: 47%
  - 2020: 58%
  - 2021: 64%

- **Waste Management Disclosure**
  - 2017: 27%
  - 2018: 32%
  - 2019: 39%
  - 2020: 43%
  - 2021: 52%

Data based on 100 largest REITs by equity market capitalization.

Source: https://www.reit.com/investing/reits-sustainability/reit-esg-dashboard
ENERGY PERFORMANCE AND GHG EMISSIONS

U.S. City and State Policies for Existing Buildings: Building Performance Standards

Source: https://www.imt.org/resources/map-building-performance-standards/
<table>
<thead>
<tr>
<th>Real Estate Owners/Investors</th>
<th>Headquarters</th>
<th>AUM (US$ Billions)</th>
<th>Net-Zero Carbon By</th>
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<tbody>
<tr>
<td>City Development Limited</td>
<td>Singapore</td>
<td>5</td>
<td>2030</td>
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<tr>
<td>Heitman</td>
<td>United States</td>
<td>44</td>
<td>2030</td>
</tr>
<tr>
<td>CBRE Investment Management</td>
<td>United States</td>
<td>129</td>
<td>2040</td>
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<tr>
<td>Nuveen Real Estate</td>
<td>United States</td>
<td>133</td>
<td>2040</td>
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<tr>
<td>Allianz Real Estate</td>
<td>Germany</td>
<td>88</td>
<td>2050</td>
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<tr>
<td>AXA Investment Managers</td>
<td>France</td>
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<tr>
<td>PGIM Real Estate</td>
<td>United States</td>
<td>190</td>
<td>2050</td>
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<tr>
<td>Brookfield Properties</td>
<td>Canada</td>
<td>210</td>
<td>2050</td>
</tr>
</tbody>
</table>

Source: Company websites, CBRE Research, October 2021.

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**REDUCE DEMAND**

Identify means of reducing energy demand at sites, especially during peak hours.

**ENERGY EFFICIENCY**

Deploy measures to reduce total energy consumption throughout the day.

**ONSITE RENEWABLES**

Where practical, install onsite renewable generation facilities.

**OFFSITE RENEWABLES**

Work with utilities and suppliers for offsite purchasing opportunities.

Renewable Energy Credits (RECs) and carbon offsets:

Address remaining emissions by purchasing carbon offsets and verified RECs.

Source: Elme Communities 2022 ESG Report
CLIMATE PHYSICAL AND TRANSITIONAL RISK

- Know your climate-related risks
  - Physical Risk: Loss and Damage due to climate, such as drought, storms, wildfire
  - Transitional Risk: Changing regulation focused on reducing carbon emissions
- Install preventive measures features and complete thorough maintenance
- Draft crisis-management communications and conduct proper trainings

Source: Task Force on Climate-Related Financial Disclosure [https://www.fsb-tcfd.org/about](https://www.fsb-tcfd.org/about)
WHY DO WE NEED DATA FOR SUSTAINABILITY?

WHAT DOES THE SOLUTION ARCHITECTURE LOOK LIKE?

WHAT CAN I DO?
Scopes of emissions

SCOPE 2 INDIRECT
- Purchase utilities
- Capital goods
- Transportation and distribution
- Fuel and energy related activities
- Waste generated in operations
- Business travel
- Employee commuting
- Leased assets

SCOPE 3 INDIRECT
- Use of sold products
- End of life treatment of sold products
- Leased assets
- Franchises
- Investments

SCOPE 3 INDIRECT
- Processing and sold products
- Transportation and distribution
- Company vehicles
- Company operations

SCOPE 1 DIRECT
- Leased assets

UPSTREAM ACTIVITIES

REPORTING COMPANY

DOWNSTREAM ACTIVITIES
Data Ownership: Legal control of and responsibility for the collected data with consent for a specific purpose. Becomes a currency – extremely valuable.

Data Stewardship: Serving as a responsible party protecting the quality of the data and ensure the collection is for the intended use.

Personally identifiable information (PII): Any data that can identify a specific individual. It should be specified if devices or systems will or will not collect PII.

Data tagging: Structured and normalized tagging of all sub-system data flowing in the network and allows for data visualization, unique identification and standardization across different vendor systems.

Data Granularity: Data granularity is the level of detail a device or system collects information at and refers to time interval, format, spatial placement, etc.
HOW DO I DETERMINE MY SCOPE n EMMISSIONS?
SMART BUILDINGS & SUSTAINABILITY
SYSTEM ARCHITECTURE

COGNITION

CONTROL

CARRY

COLLECT

Facility Related Control Systems

Converged Network

Control & Data Exchange Environment

Cloud

COLLECT

CARRY

CONTROL

COGNITION
SMART BUILDINGS & SUSTAINABILITY

WHAT CAN I DO?

• Communication-ready water, gas and energy meters
• Campus connectivity: fiber over copper
• Software for data collection, analysis and insights
• Use the data: leak detection, awareness, incentives, community, maintenance, planning
GPON Sustainability

- Converged Infrastructure uses 70% less linear feet of cable
- Consumes 12x less energy than copper
- Manufacturing impact (per 200 cable feet): 1,000 Kg vs .06 Kg
- Long-lasting – Saves up to 50% on future network upgrades and reduce resident disruption by eliminating need to install new cable.
- 5x-10X longer lifespan, reduces need to manufacture
- 50% fewer repairs
Fiber to the Edge: Sustainability in Action

- 180,000 sq. ft. building
- Wireless First Environment
- Enable 1,392 ports

Day 1 Applications:
Legacy Copper vs. Fiber to the Edge Network Design

### Legacy Copper LAN
- Category Cable Limited to 300 ft
- Distributed power & switches in IDF

### Fiber to the Edge
- Centralized Switches + Power
- Fiber + Power (Composite Cable)
- Zone

### Design Considerations

<table>
<thead>
<tr>
<th></th>
<th>Traditional Cat 6A</th>
<th>Corning SD-LAN Actifi 2f/2cu</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDF</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>IDFs</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>CAT6A Drops</td>
<td>2,326</td>
<td>0</td>
</tr>
<tr>
<td>Fiber Drops</td>
<td>115</td>
<td>509</td>
</tr>
<tr>
<td>Linear Ft of Cable</td>
<td>252,870</td>
<td>82,070</td>
</tr>
<tr>
<td>Cable Tray</td>
<td>24W x 6D</td>
<td>12W x 2D</td>
</tr>
<tr>
<td>Switch Ports</td>
<td>1392</td>
<td>2157</td>
</tr>
</tbody>
</table>
Based on 3rd party LCA results for ActiFi® cable and published EPDs for Cat 6A cable & trays (excludes use and installation)
From 6 IDFs to 1 main MDF, Reduction in HVAC & Ancillary Equipment plus saved $50K/TR buildout

↓ 70%

↓ 80%

↓ 50%

From 61cm to 30cm Cable Trays

Lots of room for Expansion

Fiber to the Edge – Less Materials, Less Space
Life Cycle Assessment – Actifi™ Cable vs Cat 6A

Installed Cable - Embodied Carbon
MT CO2e

<table>
<thead>
<tr>
<th></th>
<th>Traditional Cat 6A UTP</th>
<th>Corning Actifi 2f,2cu</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td>9X reduction in</td>
<td></td>
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<tr>
<td>Carbon Footprint</td>
<td></td>
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</tr>
</tbody>
</table>

27X reduction of Embodied Carbon vs traditional copper over 30-year lifetime of building, assuming 3 technology refresh cycles

Operational Carbon Reduction
Eliminated 5 IDF, Reduced HVAC load

- Delivers Energy Savings of 68,805 kWh per year
- Reduced CO2e emissions 49 Metric Tonnes per year
- Realizes Energy Cost Savings of $7,568 per year
- KM driven by avg gas powered car 194,787 km per year
Whole building Life Cycle Assessment

EMBODIED CARBON YR 1

- Structure: 46.5%
- Architecture: 43.6%
- Interiors: 9.4%
- Network: 0.6%

Global Warming Potential
8,539 MT-CO2e

OPERATIONAL CARBON

Global Warming Potential
959.8 MT-CO2e/YR
Whole Building Life Cycle Analysis

**Year 1 Life Cycle**

- Corning HQ (Composite): 8,549 MT CO₂e
- Baseline (Cat 6A): 8,591 MT CO₂e

- Embodied Carbon: 960 MT CO₂e
- Operational Carbon: 1,045 MT CO₂e

**Year 30 Life Cycle**

- Corning HQ (Composite): 28,794 MT CO₂e
- Baseline (Cat 6A): 31,341 MT CO₂e

- Embodied Carbon: 8,748 MT CO₂e
- Operational Carbon: 8,549 MT CO₂e

**Improvement**

- Year 1: 1.3%
- Year 30: 6.8%
Corning’s SDLAN and CIP Remote Power supported by unified software platform

Agnostic Network SDLAN Layer 2 switches works with multiple core switch vendors

Corning CIP Low Voltage Power controls all DC powered devices

Case Study: Sustainable Living Innovations MDU Building
Case Study: Sustainable Living Innovations MDU Building

**Capex Reduction**
- **Reduction in cable infrastructure-system converged on one platform**
  - Eliminates AC panels, breakers and infrastructure moving to smaller, more cost-effective, more sustainable LV cabling
- **Low voltage lighting**
  - Reduces CAPEX over traditional AC installations by 35%
- **Standardized infrastructure**
  - Reduction in SKU’s and predictable repeatability for purchasing and implementation

**Opex Reduction**
- **Intelligent system leads to more robust remote management**
  - Reduces unnecessary truck rolls to site
  - Labor often becomes automated remote software fixes
  - Ability to cycle power circuits remotely
- **Eliminating AC driven systems, reduces energy consumption**
  - Saves 20% in lighting energy consumption

**Enabling More**
- **Connectivity as a Service**
  - Generates revenue - Wi-Fi, Internet, 5G
  - SLI Operations monitors and dispatches required contractor across entire building and SLI portfolio.
- **Fiber has near unlimited capacity and bandwidth**
  - Eliminates costly rip and replace upgrades of category cable infrastructure (typical 5-year cycle)
  - Sustainable, Future Ready