prescriptive data

10 Steps

Carbon Zero Real Estate Operations

Microsoft

Introduction

Increasingly over the last decade, there has been a magnified focus and call for leadership from the world's largest enterprises to bolster their role in slowing the velocity of climate change and mitigating its cascading effects at a planetary, fiduciary, commercial and individual scale.

The Market Need:

- Enterprise commitment to net-zero carbon emission goals has been pervasive across the corporate ecosystem.
- Calls from consumers and investors for transparency around climate impact and emissions have grown increasingly louder.
- Regulatory mandates governing emissions have already entered the largest commercial markets, including state and local laws in the US such as New York's Local Law 97 or California's Cap and Trade Act, and international legislation such as the Kyoto Protocol, European Climate Law, the European Green Deal and the European Union Emissions Trading System.

The Challenge:

Globally pervasive climate-friendly legislation has created an immediate need for corporate entities to decarbonize at scale and with haste, from both an operational and investment perspective. The demand for verifiable progress towards sustainability commitments requires visibility and granularity, which pose a larger challenge for enterprises: data.

NANTUM OS

Nantum OS Solution:

In response to this market challenge, we been working in close collaboration with KPMG and Microsoft to define a comprehensive decarbonization approach that harnesses innovative technology for the enablement of verifiable climate accounting, emissions management, and regulatory compliance.

Our approach is outlined below as a series of sequential and measurable steps, enabling easy visualization of progress.

10 Steps To Scalable Real Estate Decarbonization →

Step 1

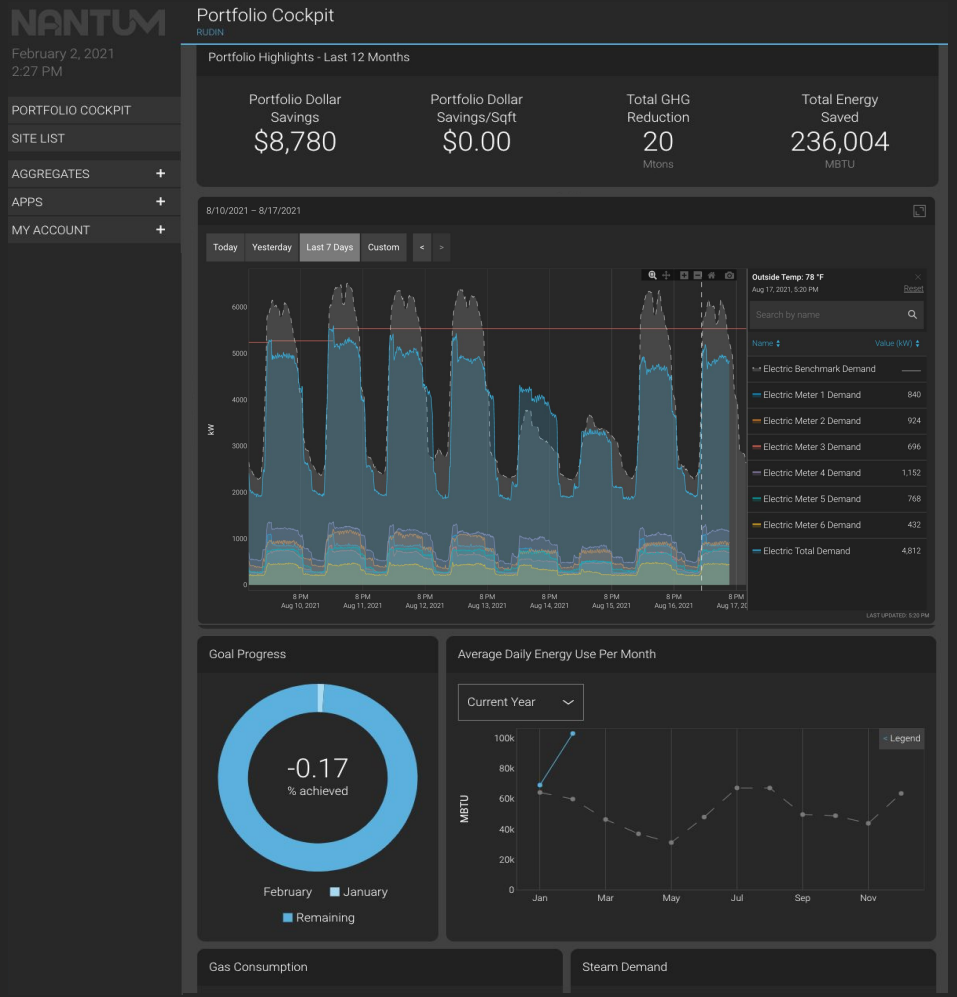
Measure Energy Intensity Across Entire Real Estate Portfolio

<u>Getting Started:</u>

- Connect your electric, gas, and steam submeters to Nantum OS for real-time monitoring.
- Integrate your Energy Star Portfolio Manager account with Nantum OS.
- Integrate and visualize historical meter data into Nantum OS.

<u>Taking Action:</u>

- Set and track portfolio-wide energy reduction goals.
- Track and measure your sites' aggregated Monthly energy consumption against actual performance.
- Benchmark your portfolio's Annual performance against the previous year.

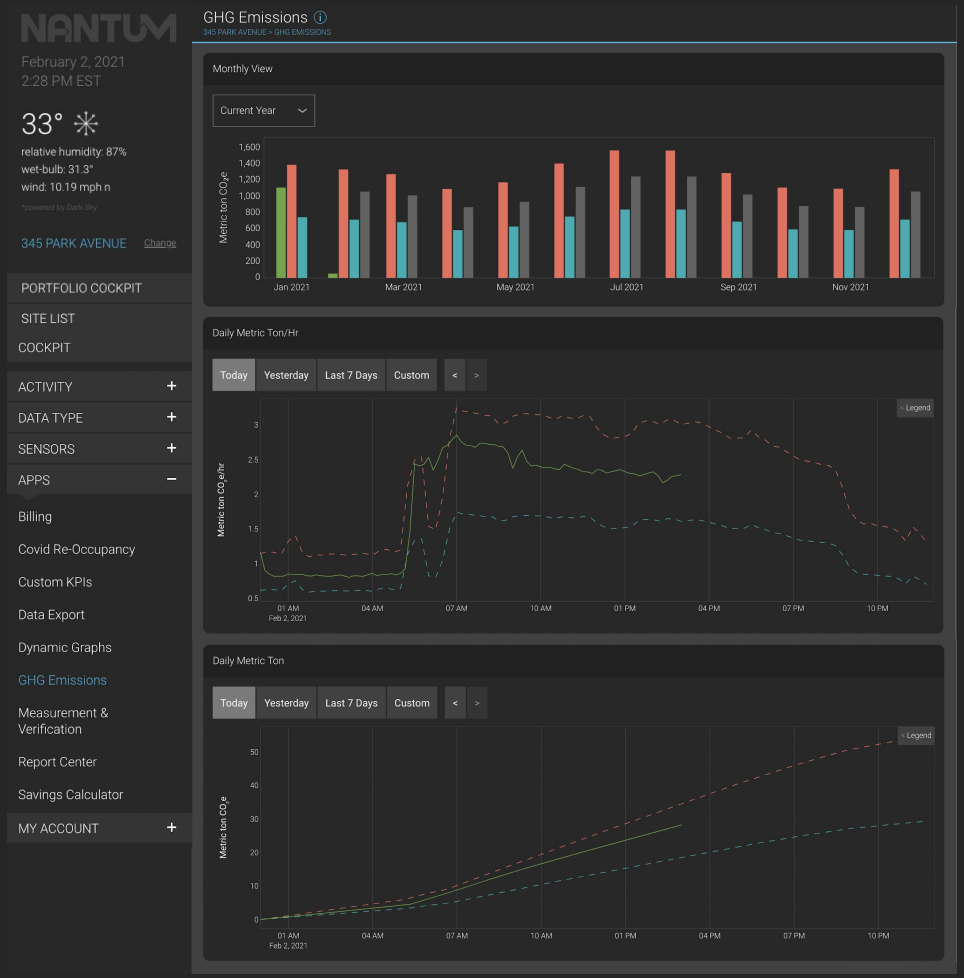


Step 2

Measure Carbon Emissions Across Entire Real Estate Portfolio

Using your historical and real-time meter and submeter data, Nantum OS:

- Calculates and visualizes your carbon emissions in real-time.
- Visualizes your historical carbon emissions.
- Uses ML to predict your daily, monthly, and annual carbon emissions forecasts for sustainability and ESG planning.
- Understands which of your real estate locations have the highest carbon footprint.
- Compares against internal corporate mandates and carbon emission reduction goals.
- Provides real-time regulatory compliance and exposure analysis.



Step 3

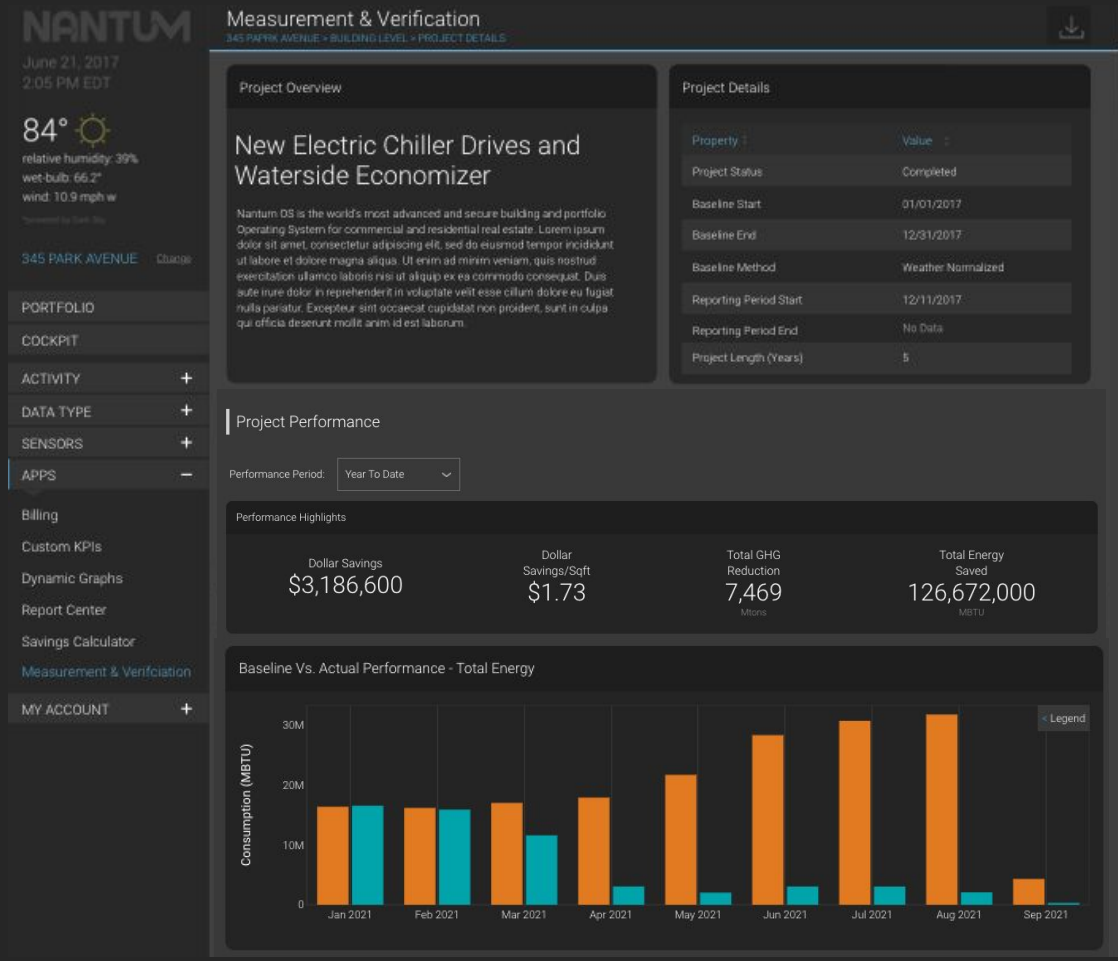
Track All Your Energy Reduction Project ROI In Real-Time

Nantum's Measurement and Verification App allows energy managers, operations teams, and sustainability managers to track and evaluate energy savings projects within your building in real-time.

View project KPIs around energy and dollars savings, GHG reductions, and ROI.

Measure accuracy and efficacy of, and adherence to, energy conservation measures (ECM).

Measure success of energy efficiency projects using IPMVP and ASHRAE Guideline 14 standards incorporating asset grade data (AGD).



Step 4

Automated Benchmark Reporting

Analyze and download various energy reports vetted by industry experts. Examples include Monthly composite utility comparison reports, peak electric demand by day, carbon emissions by quarter, and more!

Design Custom Reports:
Work with the Prescriptive Data team to customize meaningful reports for you to share with your team.

Step 5

Integrate Solar, On-Site Generation, Fuel Cell & Battery Storage

Nantum connects to revenue grade meters directly from solar, wind, and on-site building batteries / thermal storage.

Nantum allows sustainability teams to see how much energy has been generated daily, monthly, and annually.

Nantum can benchmark the energy generated as well as use past performance to provide generation predictions.

On-site generation allows Nantum to automate load shedding during high demand or demand response periods. It also allows for automated cost reduction when purchasing and storing energy during low price periods.

Step 6

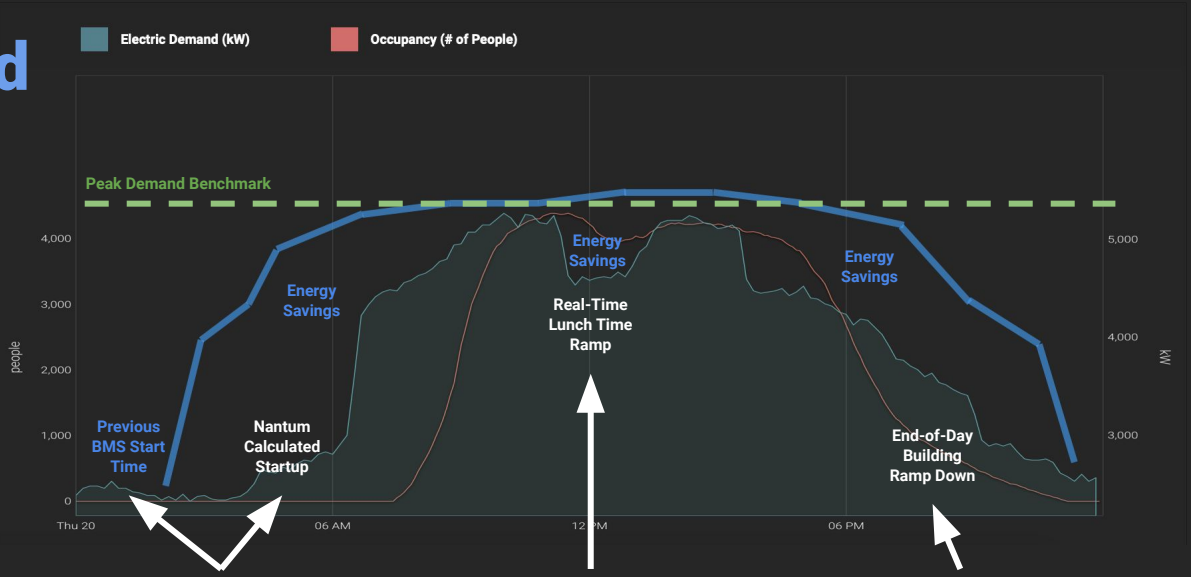
A.I. Occupancy-Based Energy Reduction Automation (ECMs)

Connect:

- BMS [or] Wifi Thermostats
- Occupancy sensors [or] Access Control
- Interior Temperature Sensors
- Indoor Air Quality Sensors

Nantum OS uses artificial intelligence and machine learning to automate spaces using the least amount of energy to maximize occupant comfort.

- ML Prediction of occupant arrival and departure times (including lunchtime).
- Only cool or heat spaces that have actual people in them.



Calculated Startup

Nantum looks at historical BMS performance, occupancy data, and weather prediction to provide a recommended (or automated) building startup time. Use the least amount of energy to reach interior comfort.

Mid-Day Ramps

Nantum correlates building occupancy with BMS setpoints and fan speeds to reduce building energy usage. As occupants leave and enter the building, Nantum adjusts your BMS.

End Of Day Ramp Down

Nantum correlates a building's thermal inertia with end of day occupancy, to ramp down the BMS as people leave the building, all in real-time.

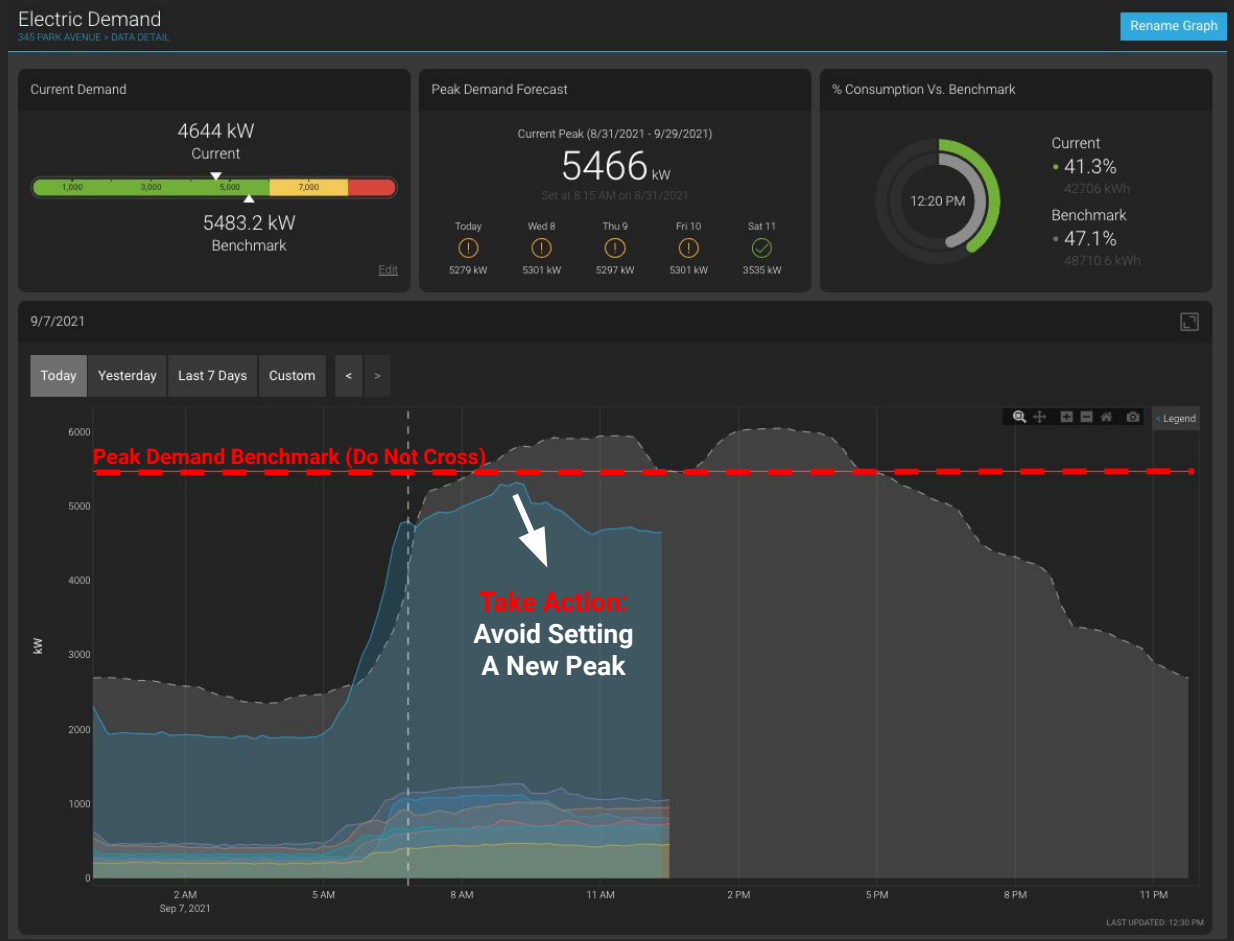
Step 7

Automate Peak Demand Charge Avoidance

Nantum OS helps real estate operators reduce peak demand charges, which typically represent more than 50% of the average monthly electric bill.

Real Estate and Sustainability teams can:

- Visualize Electric Peak Demand Benchmark (the do not cross this line) in real-time.
- Customize and design automation rules that limit peak demand charges without compromising occupancy comfort.



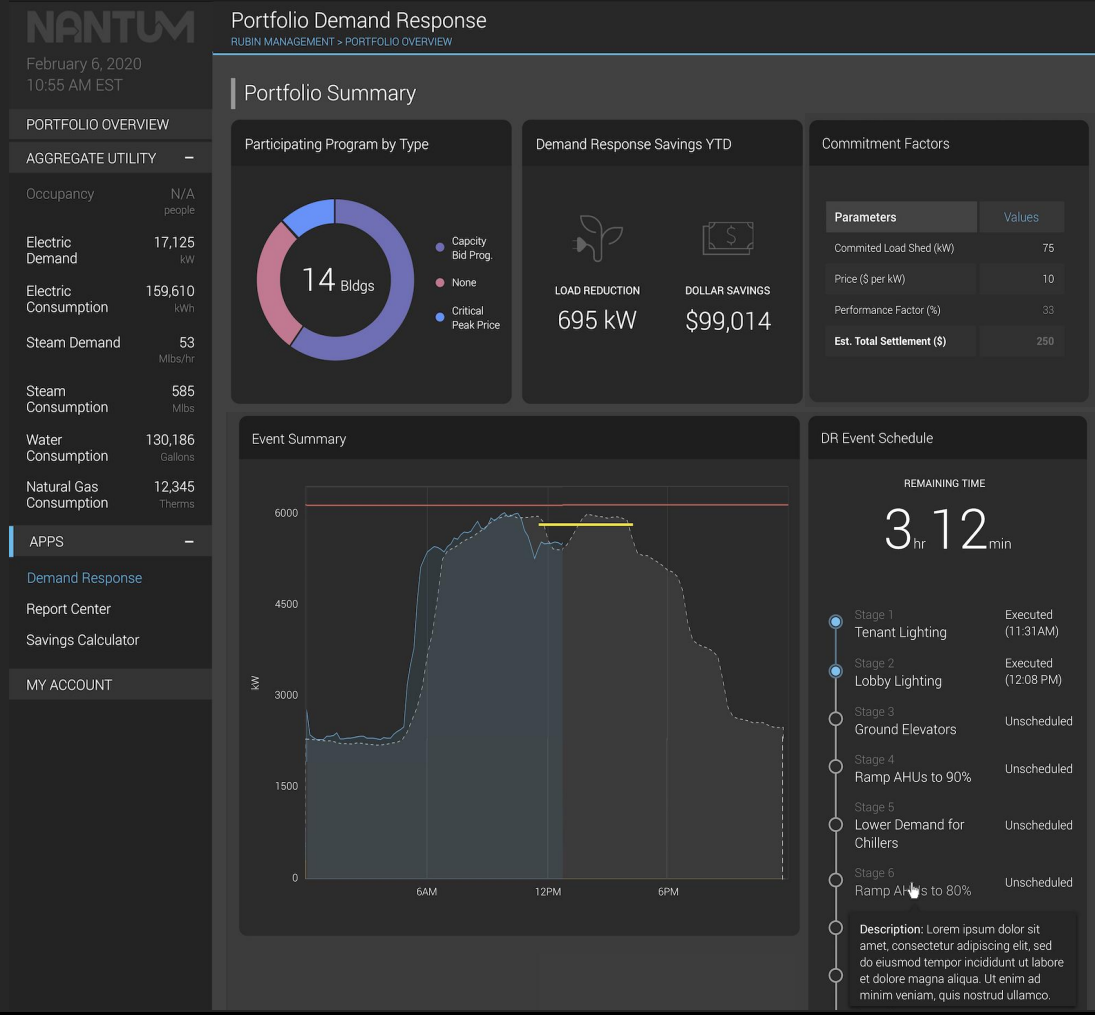
Step 8

Automate Portfolio Demand Response Programs

Facilitate and streamline your manual demand response efforts with Nantum's ADR app to maximize your demand response revenue.

Leveraging the OpenADR Protocol, Nantum ADR allows you to track and manage your portfolio's demand response efforts in a single view.

- Define a unique automation program for your sites based on building audits conducted by certified energy professionals.
- Automate demand response programming and see DR events trigger and execute based on the utility's signal.



Step 9

Procure Renewable Energy & Create Renewable Energy Credits (RECs)

Through the KPMG CAI consortium, Nantum OS allows users to visualize energy generation traced back to its original source as well as the amount of RECs that have been purchased over a specific period of time.

The RECs can be matched with demand / consumption data to help solve challenges around Net Zero Carbon, and more specifically in NYC, Local Law 97 to help buildings get under LL97 thresholds or be fully dependent on renewable energy.

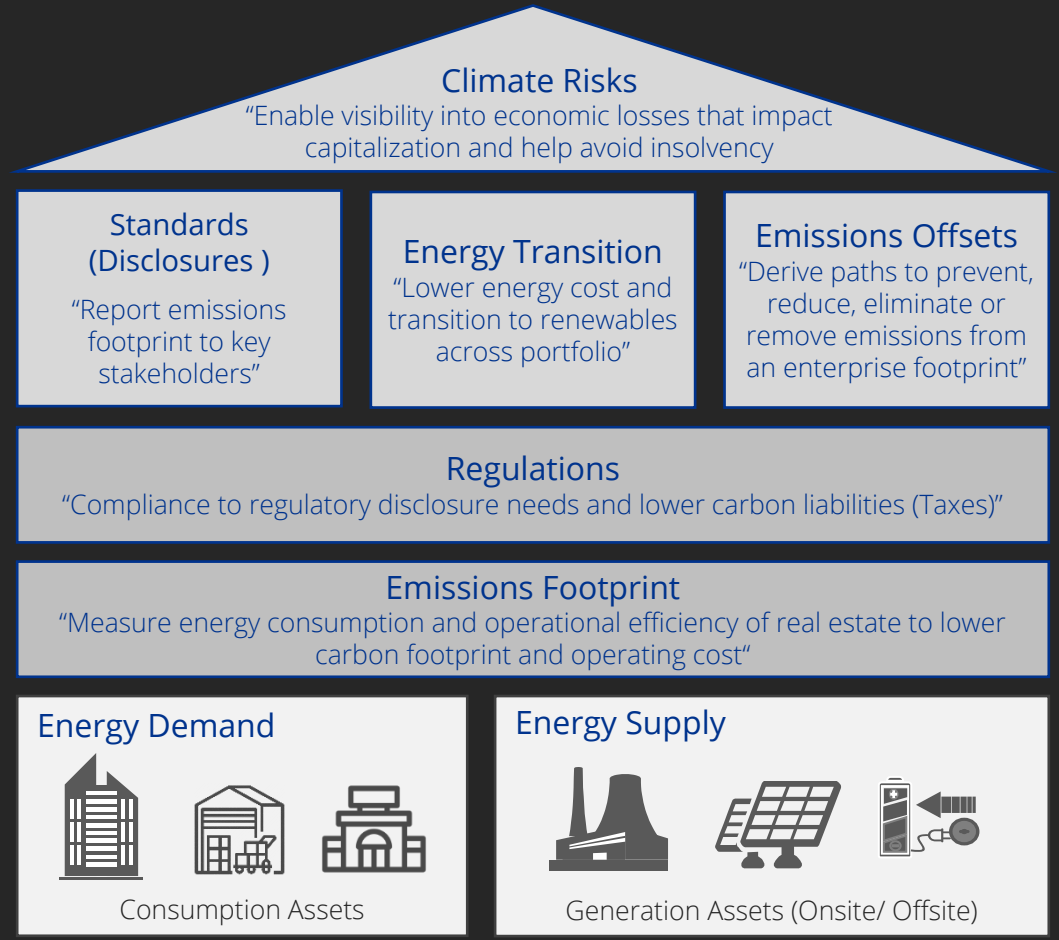
Step 10

Carbon Zero Validation With KPMG Carbon Accounting

Project Description
Implementing KPMG's Climate Accounting Infrastructure (CAI) to capture provable environmental data from real estate to measure energy consumption to facilitate energy optimization, energy cost reduction, purchase renewables, estimate emissions, and enable accurate environmental reporting to internal and external stakeholders following standards such as SASB, TCFD and New York City's Climate Mobilization act (Local Law 97)

Approach
- Develop the methodology to capture near-real time data from building management systems, utility meters, utilities, renewable assets, enterprise systems, and others third party data providers
- Deploy CAI on client's cloud infrastructure to integrate data from IT-OT systems at the individual client buildings for measuring energy consumption and supplied energy mix
- Estimate carbon footprint at the individual building and the portfolio level considering consumption of different natural resources, onsite electricity generation, offsite electricity, energy mix, and earn and burn of offsets
- Enable the tracking of client progress toward decarbonization goals and disclosure reporting in compliance to regulations and industry standards

Success Factors
- Measure carbon footprint at the building and portfolio level
- Lower the cost of building operations and emissions through energy efficiency, energy cost optimization, transition to renewables, and retrofitting
- Enable the path to tokenize renewable energy certificate and trade credits with and across the portfolio

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