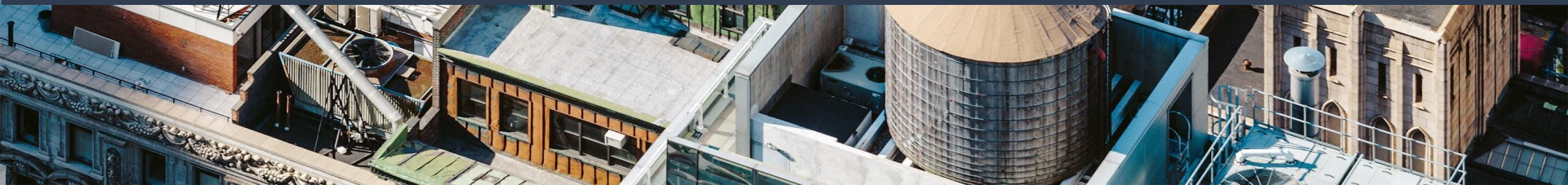


An aerial photograph of a city street scene, showing several multi-story buildings with various architectural styles, including brick and stone facades. The lighting suggests a bright, sunny day.

Data Science & Decarbonization

Mark Siemers, Director of Engineering - Measurabl
Center for the Built Environment - November 2022





Real Estate Industry Timeline

- Distant Past
 - Ignorance & Apathy
- Recent Past
 - Attention
 - Quantification
- Present
 - Meter to Management to Market
 - Action
 - Incentives
- Future



Recent Past: Attention

What does it mean to be “Green”?

Defining Green



G R E S B



How do you Quantify “Green”?

- Challenges
 - Data Collection
 - Analysis
 - Benchmarking



Measurabl helps solve those challenges

Active Reports

GRESB 2022
0% Complete

CDP 2022 Climate Change
0% Complete

ENERGY STAR®

52/52
Active Sites Shared

19/52
Sites Scored

94
Floor Area Weighted Score

Activity Log

2022

- Nov 9 An issue was detected for a utility provider on Burger Brewery location:1.
- An issue was detected for a utility provider on 900 Spear Street.
- An issue was detected for a utility provider on 235 W 76th Street.

[View All Activity](#)

Space Type Allocation

Total
119,789,895 ft²

Carbon Emissions

Nov 2021-Oct 2022 Total
143,499 MTCO₂e

Total Energy Usage

152M kWh

2M kWh

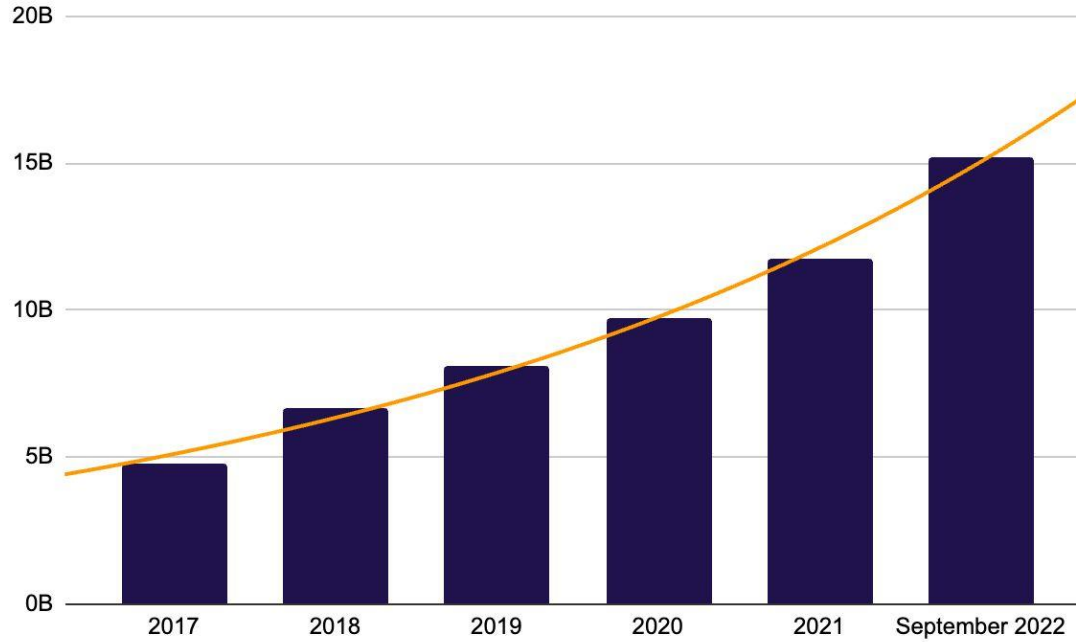
Nov Jan Mar May Jul Sep

● Nov '20-Oct '21 1,175,584,233 kWh

● Nov '21-Oct '22 587,500,157 kWh

Data Covering 15 Billion Square Feet

FLOOR AREA

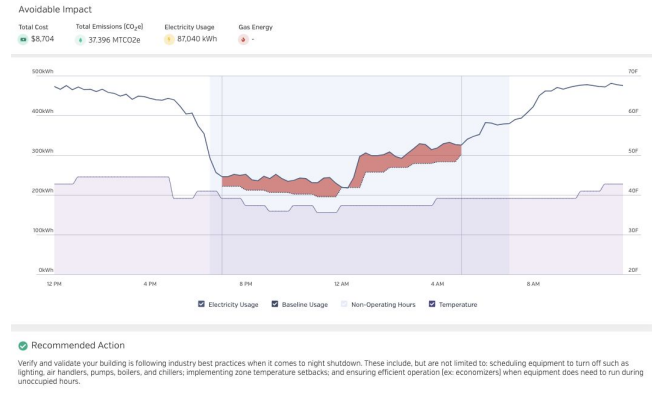
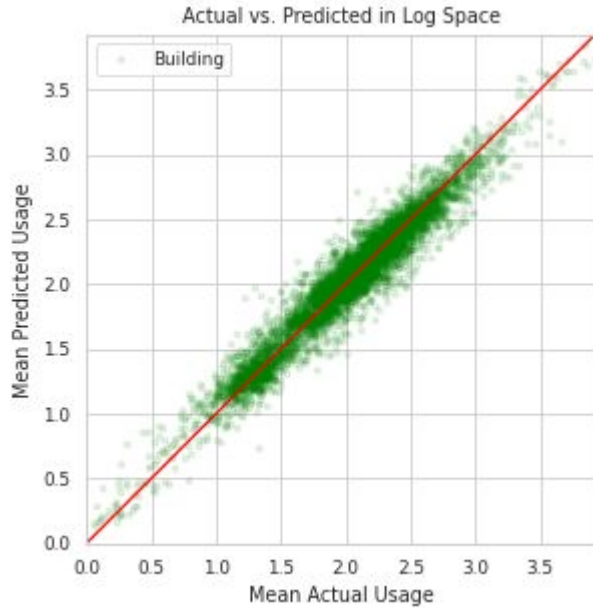




Past to Present: Data Collection to Data Science



Data Collection to Data Science



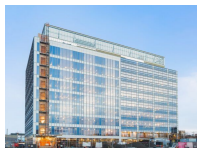
PRESENT

The tools enabled by Data Science are going to affect Decarbonization at every level of the Real Estate Industry

Meter

Management

Market



LIFE SCIENCES



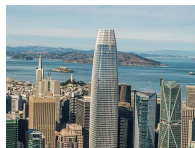
DATA CENTERS



RETAIL



MIXED-USE



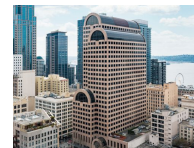
OFFICE



HOSPITALITY



INDUSTRIAL



MULTI-FAMILY



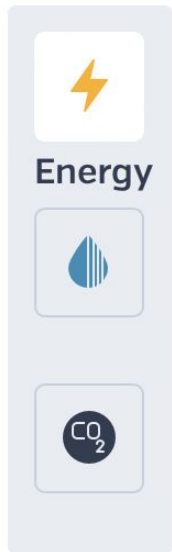
GOVERNMENT

Present: Management

Measurabl Efficiency Percentile ⓘ

Last Updated: Oct 24, 2022 at 6PM

Oct 1, 2021 - Sep 30, 2022 ⋮



↑ Top Performers

Percentile

↓ Bottom Performers

Percentile

Levi's Stadium

99

10 Main Street

1

22nd Apartment Com...

99

Partners - 11 Fillmore ...

7

235 W 76th Street

99

Apartment - A12

14

Partners - 22nd Apar...

99

San Francisco Interna...

23

123 Main Street

99

Partners - San Franci...

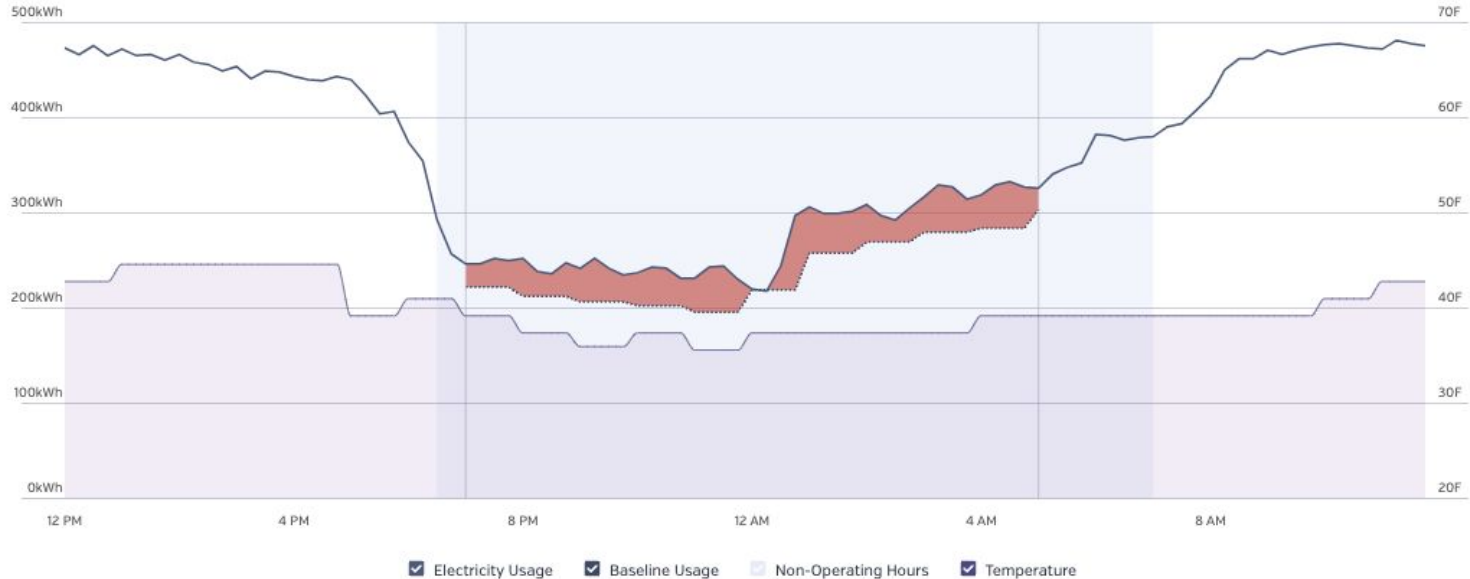
25

Using this Cohort: [ACME Asset Management](#)

Present: Meter

Avoidable Impact

Total Cost: \$8,704
Total Emissions (CO₂e): 37.396 MTCO₂e
Electricity Usage: 87,040 kWh
Gas Energy: -




Recommended Action

Verify and validate your building is following industry best practices when it comes to night shutdown. These include, but are not limited to: scheduling equipment to turn off such as lighting, air handlers, pumps, boilers, and chillers; implementing zone temperature setbacks; and ensuring efficient operation (ex: economizers) when equipment does need to run during unoccupied hours.

Present: Meter

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 \$8,704

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Present: Meter - Does it add up?

\$42.7 Million in identified cost savings

54,895 tons CO₂e avoided emissions



Market: Non-financial Data Driving Financial Outcomes

Estimated Carbon Emissions

Carbon Estimates

Absolute

All units in MTCO₂e

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2019	32.56	31.97	31.15	28.02	27.77	27.48	29.59	29.77	28.12	27.77	30.41	31.02
2020	30.22	29.83	28.15	27.35	26.30	26.37	27.75	27.29	26.39	26.73	27.70	29.25
2021	29.13	29.16	26.95	25.55	24.83	24.54	26.81	26.42	25.27	24.83	27.32	27.55
T-12	32.58	31.45	30.41	28.54	27.46	27.85	30.02	29.43	27.96	28.02	-	-

Intensity

All units in kgCO₂e/ft²

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2019	0.59	0.58	0.57	0.51	0.51	0.50	0.54	0.54	0.51	0.51	0.55	0.57
2020	0.55	0.54	0.51	0.50	0.48	0.48	0.51	0.50	0.48	0.49	0.50	0.53
2021	0.53	0.53	0.49	0.47	0.45	0.45	0.49	0.48	0.46	0.45	0.50	0.50
T-12	0.59	0.57	0.55	0.52	0.50	0.51	0.55	0.54	0.51	0.51	-	-

For what property?

Property Information

Address: 1600 Pennsylvania Avenue NW, Washington, DC 20500, USA

Coordinates: 38.8976633°, -77.0365739°

Requested Property Type: Office

Applied Property Type: Office

Year Built: 1952

Gross Floor Area: 54900 Sq Ft

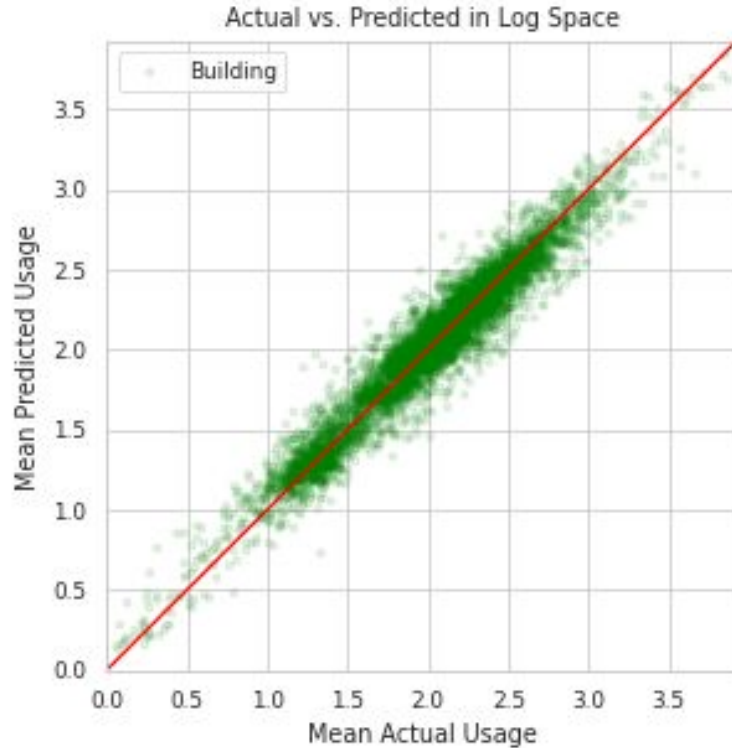




Present: Market

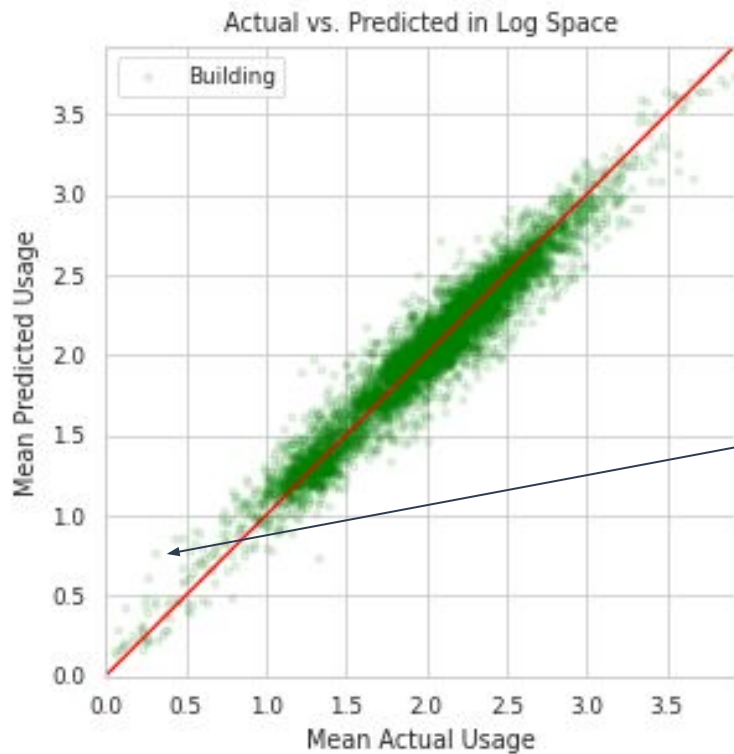
- Stakeholders utilizing carbon emissions data
 - Ratings Agencies
 - Accounting Firms
 - Stock Exchanges
 - Institutional Investors
 - Insurers
 - Lenders
 - Property Managers
 - Private Equity Investors
 - Federal, State, and Local Governments

The Market no longer needs data from you, they have accurate estimates



R-squared 0.93

What if your building is an outlier?



Your building's usage



**SHOW
ME THE
~~MONEY~~**

DATA

Blast from the Past: Ignorance & Apathy to Excellence

A brief aside about the Cincinnati Zoo,
The Greenest Zoo in America®





Back to the Future: Bringing It All Together

- Meter
 - Take real time action
 - Monitor at a granular level
- Manage
 - Understand the performance of your portfolio
 - Identify underperforming assets
 - Find outperforming assets
- Market
 - Beat the estimates
 - Outcompete for capital
 - Transparency



Conclusion

There have never been

better tools

to address **decarbonization**

There has never been

greater demand

to **prove** it's being done

Get in touch
We'd love to hear from you!



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measurabl.com



linkedin.com/company/measurabl



facebook.com/measurabl



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Thank you.



Mark Siemers

mark.siemers@measurabl.com