Impacts of Closure Periods on BU CO_2 Emissions and Local CO_2 Concentrations

Amid coronavirus pandemic, air pollution declines in Boston and elsewhere

Air pollution has dropped significantly as travel, economic activity ground to a halt

By David Abel Globe Staff, Updated March 28, 2020, 4:47 p.m.

A man sits under a star magnolia tree in the Public Garden in Boston during the coronavirus state of emergency. CRAIG F. WALKER/GLOBE STAFF/THE BOSTON GLOBE

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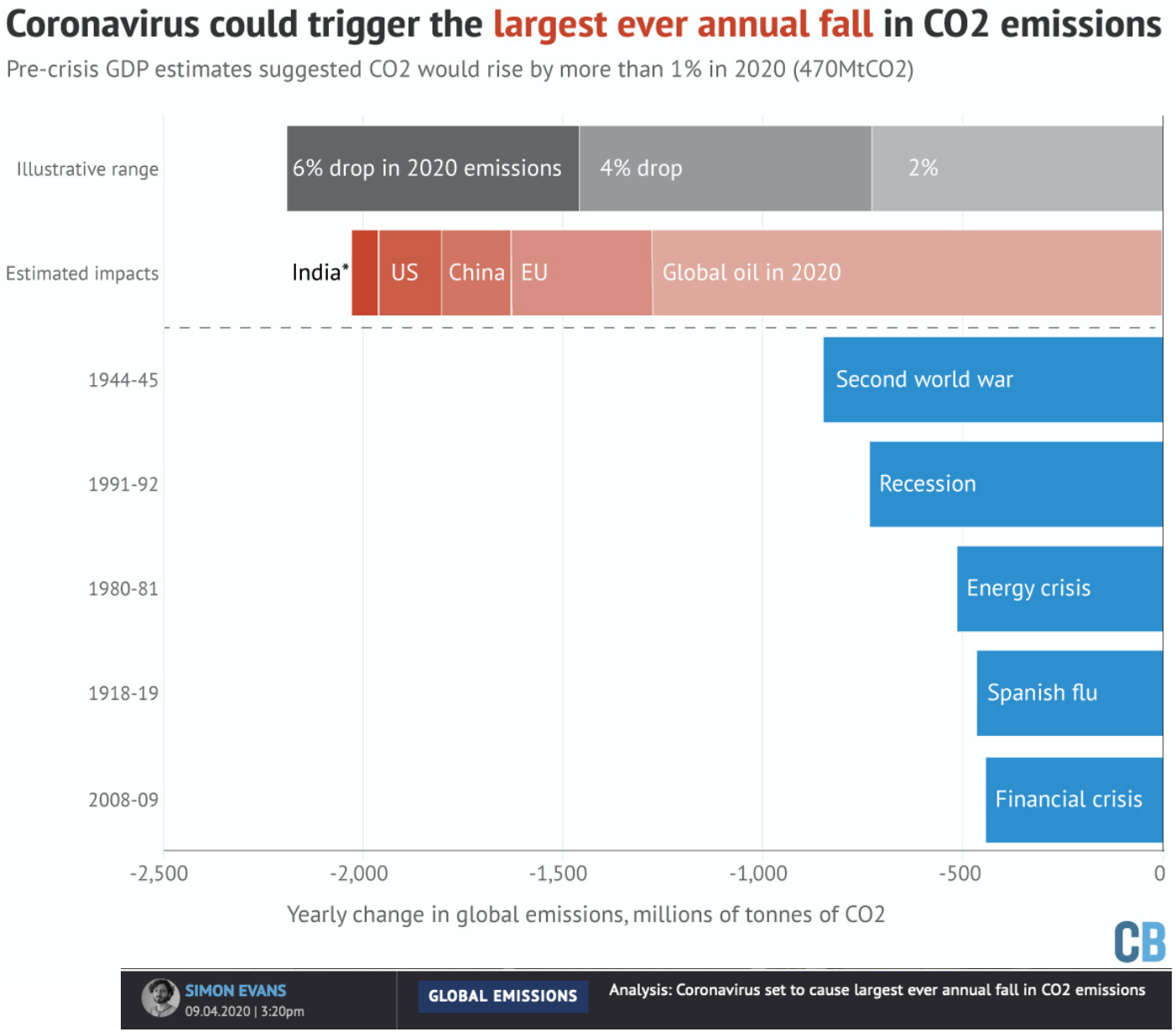
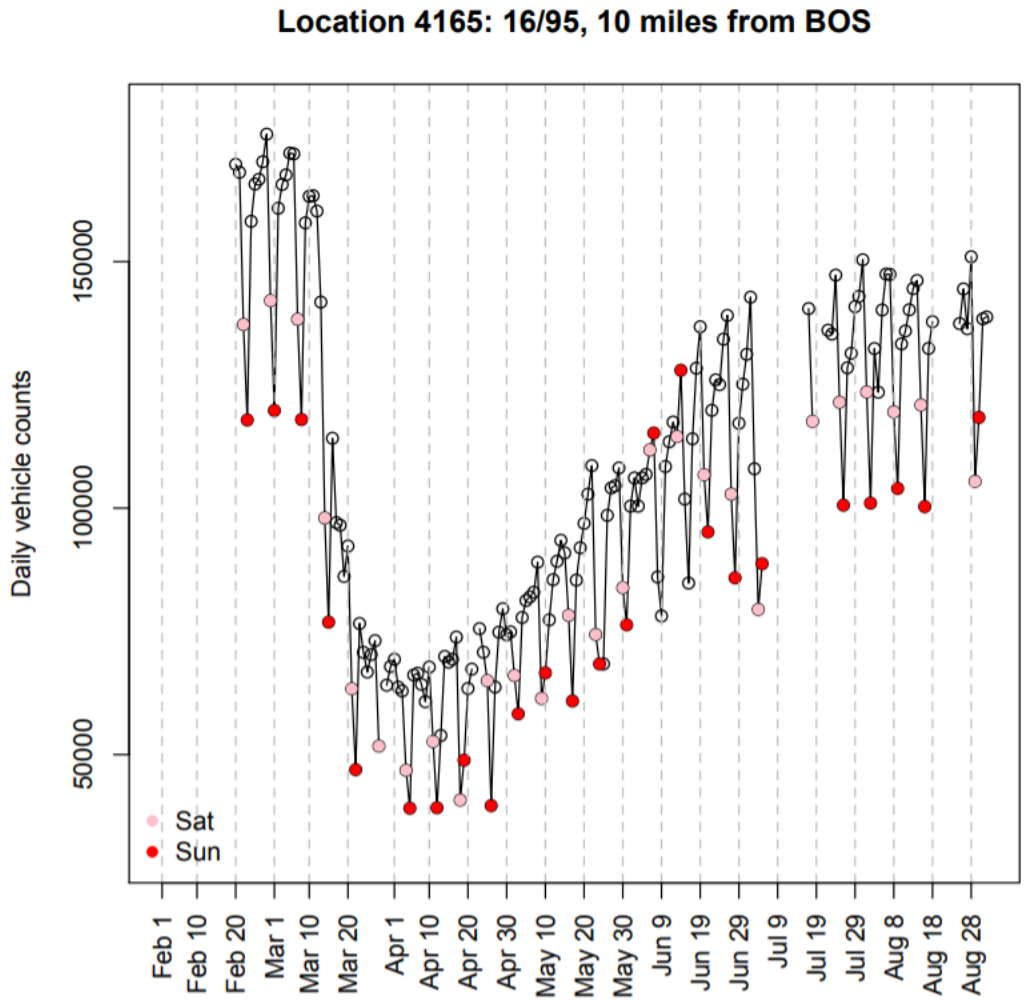
What are COVID shutdowns doing to CO_2 emission?

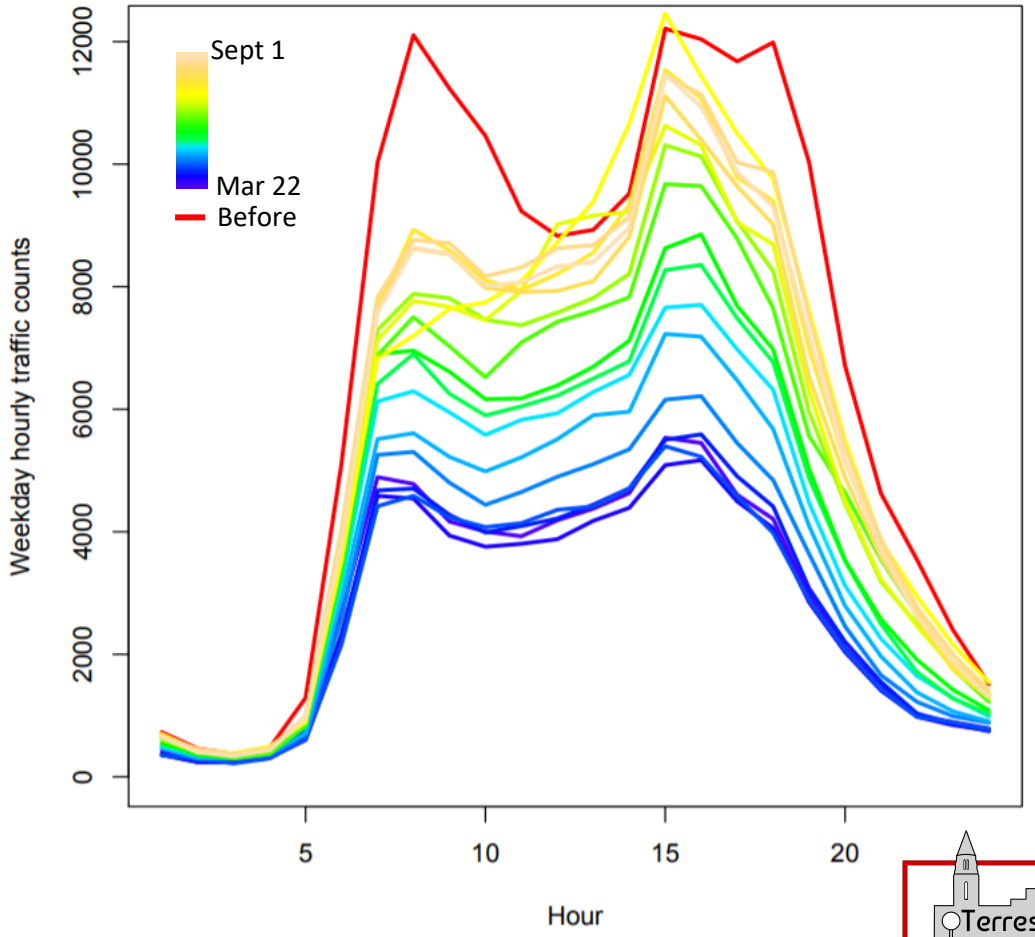
- **<u>Early, tentative</u>** estimate suggests declines of 6-8% in emissions relative to 2019, largest ever annual fall in CO_2 emissions.
- Analyses are actively ongoing, China's emissions have already rebounded and overshot pre-COVID



How about Boston?

While many office jobs are still remote, lots of emissions related activity has returned to near pre-pandemic levels





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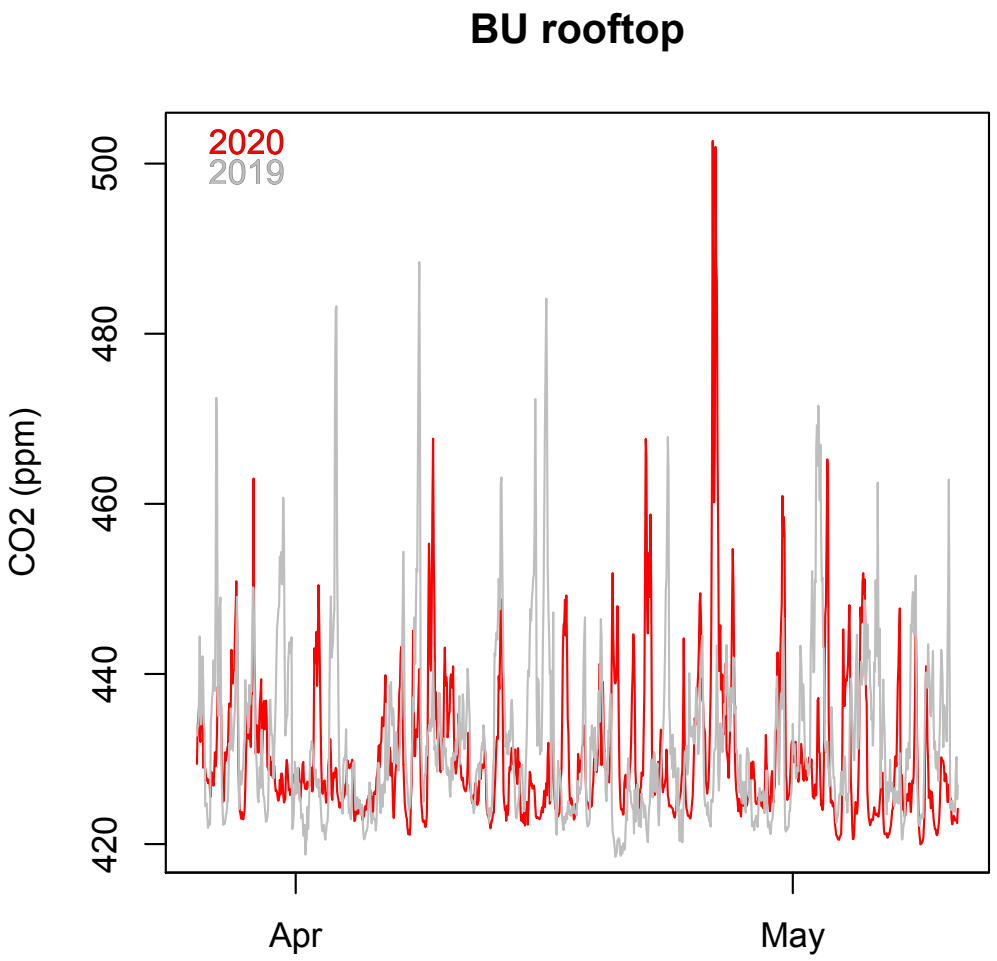
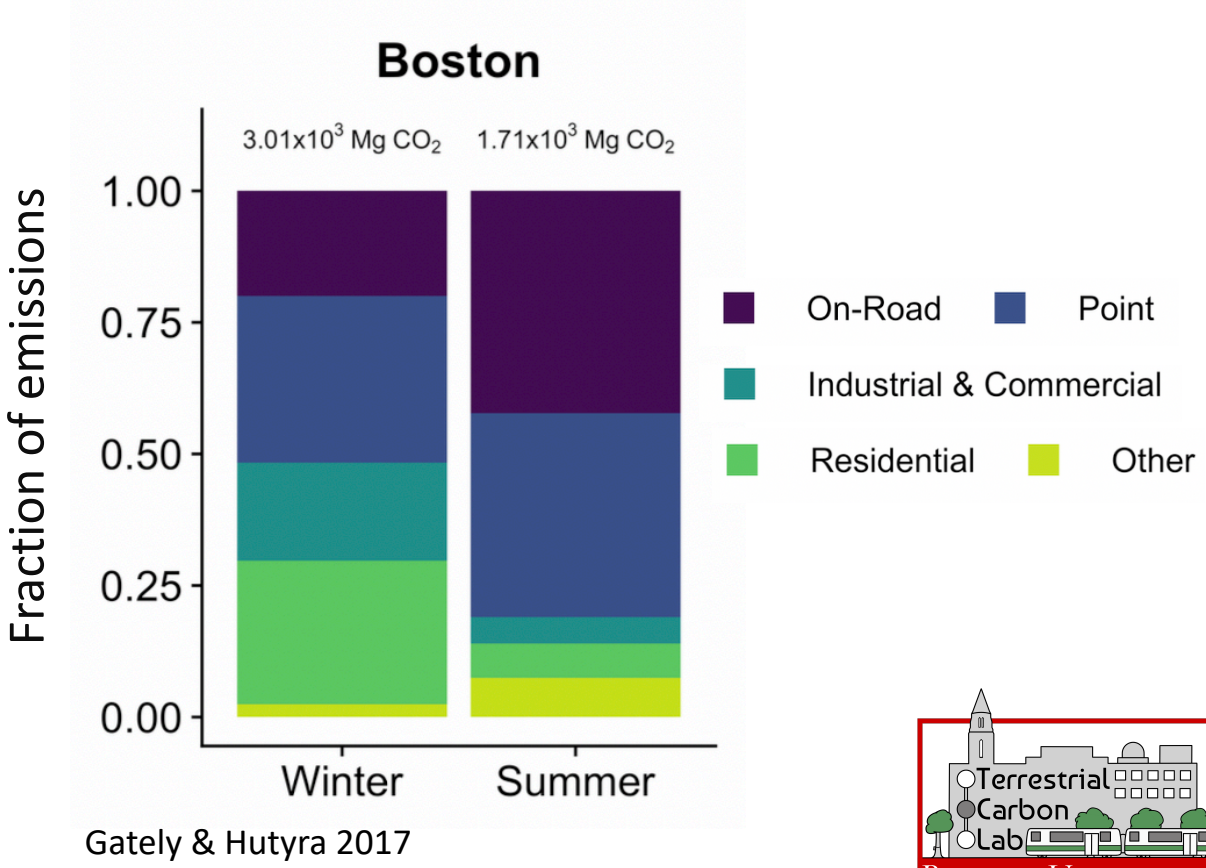
Daily, seasonal, and yearly trends are visible in the record

Heating use is declining while biology is starting to take up CO_2



Sargent, Wofsy, Hutyra, et al. unpublished



Gately & Hutyra 2017

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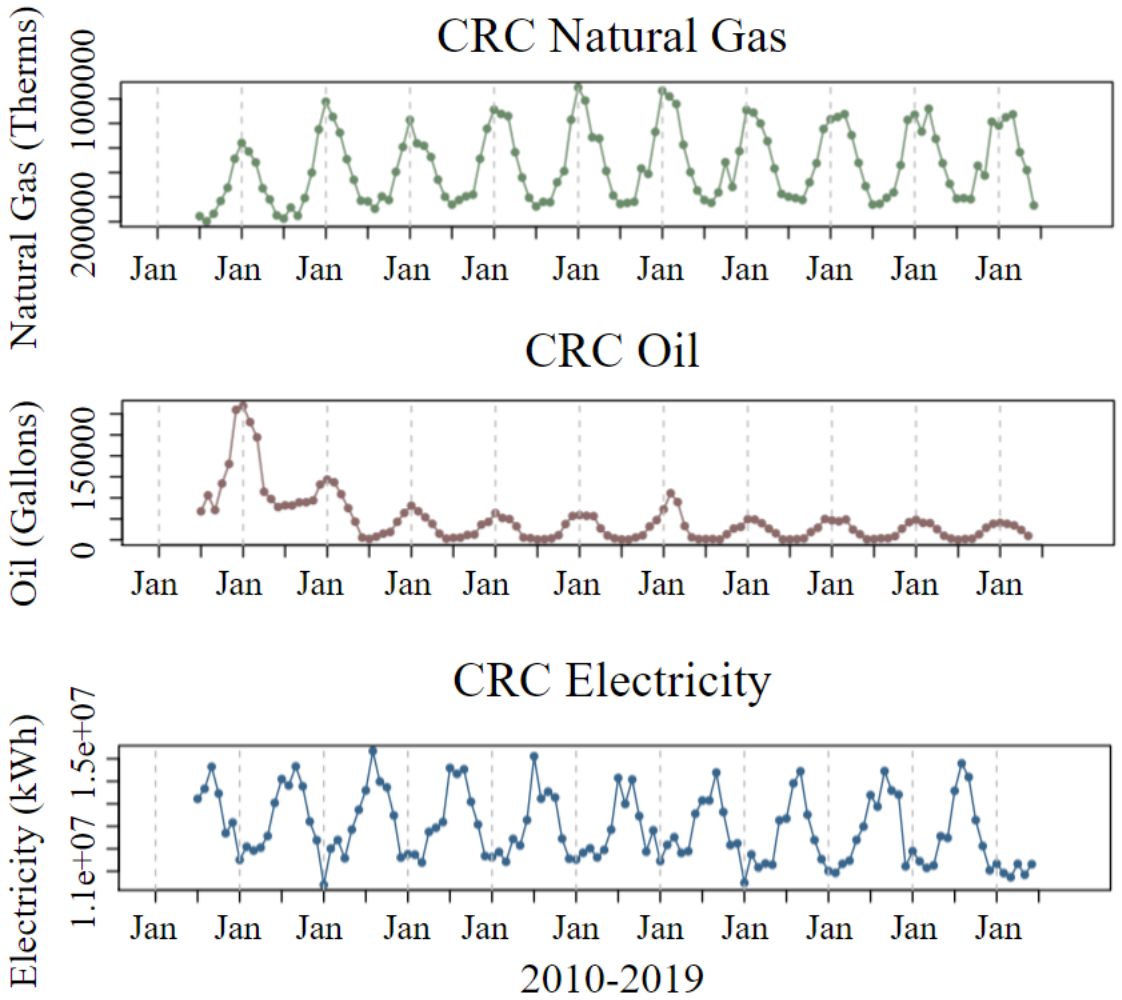
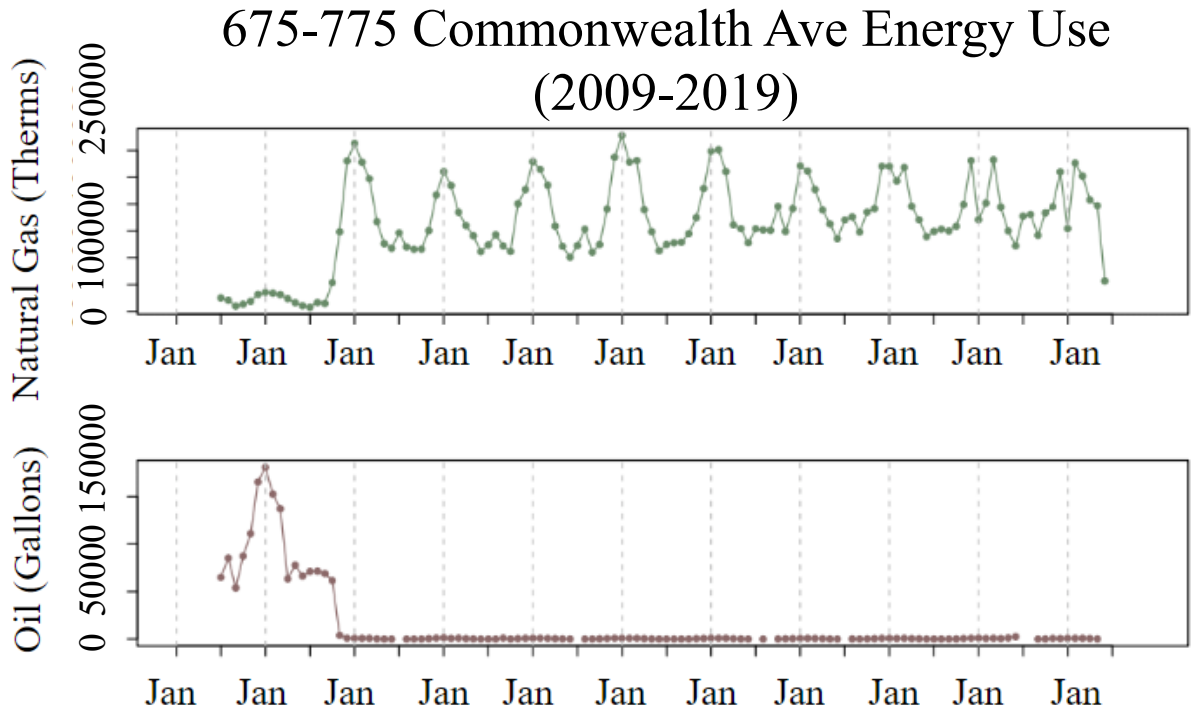
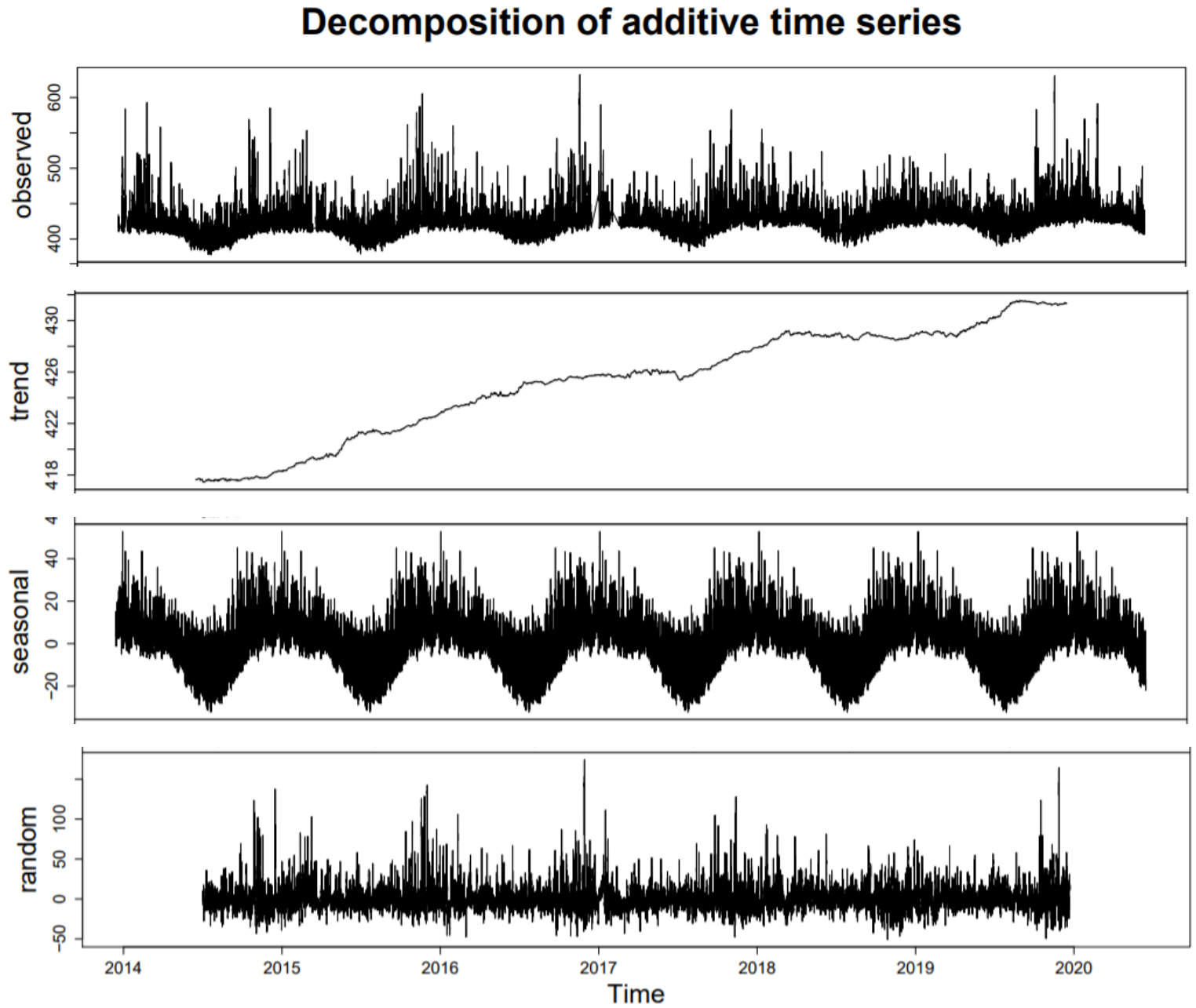
Energy use data is complicated

The electricity grid has 'greened' and BU energy profile has shifted over time. Weather, retrofits, new buildings, & campus growth are embedded throughout this signal.





CO_2 data was additively decomposed

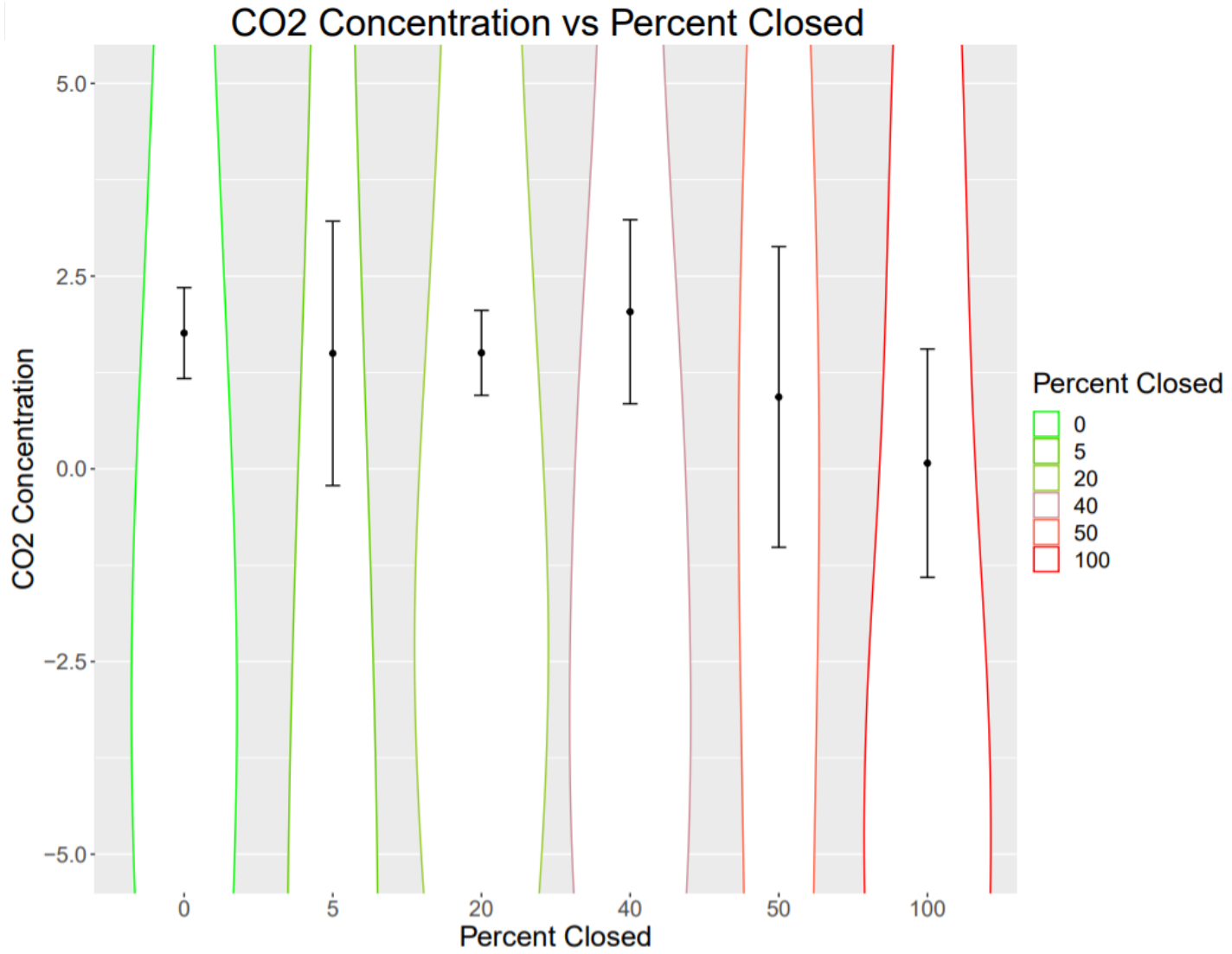


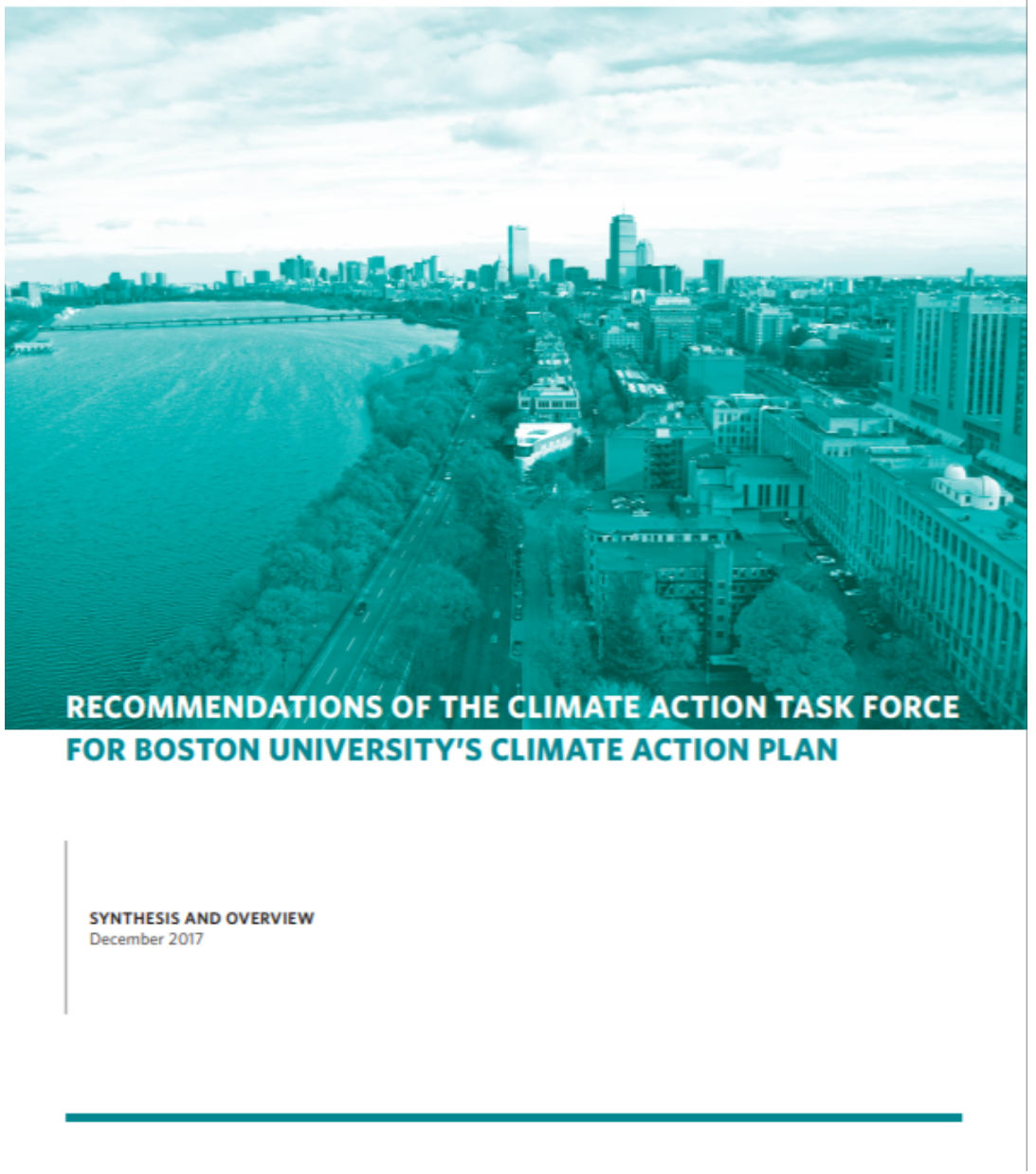
Many episodes of campus closure

Closure	Percent Closed	Number of Closures (1/2014-8/2020)
Corona Virus	100	170
Holiday	100	46
Winter Holiday	100	62
Brookline Snow Day	50	10
Winter Break	50	128
Spring Break	40	63
Summer	40	226
Thanksgiving Break	40	35
Summer Classes	20	483
Finals	5	67
Study Period	5	49

Analysis is at the early stages…

- Data is for weekday daytime hours for all seasons
- Mean and 95% confidence intervals are pictured
- Initial data is suggestive of a negative correlation between percent closed and CO_2 concentration, but the data is skewed, with wide confidence intervals



Lessons and next steps

- The Boston University climate action plan has a goal to reach net zero direct emissions by 2040
- University energy use data acts as a baseline, and includes early efforts by the university to alter their energy sources
- Through further analysis of the CO_2 concentration and closure data, we hope to uncover opportunities for future emissions reductions