

Which Buildings will Meet the GHG Emission Reduction Goal of NYC?

Exploring Urban Data with Machine Learning

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Background

*“Monitoring buildings’ energy use and emissions, and reviewing building emissions assessment methodologies, building emissions limits, goals and timeframes to further the goal of achieving a **40 percent reduction** in aggregate greenhouse gas emissions from covered buildings by calendar year **2030**, relative to such emissions for the calendar year **2005**”*

-- section 651 in Local Law 97



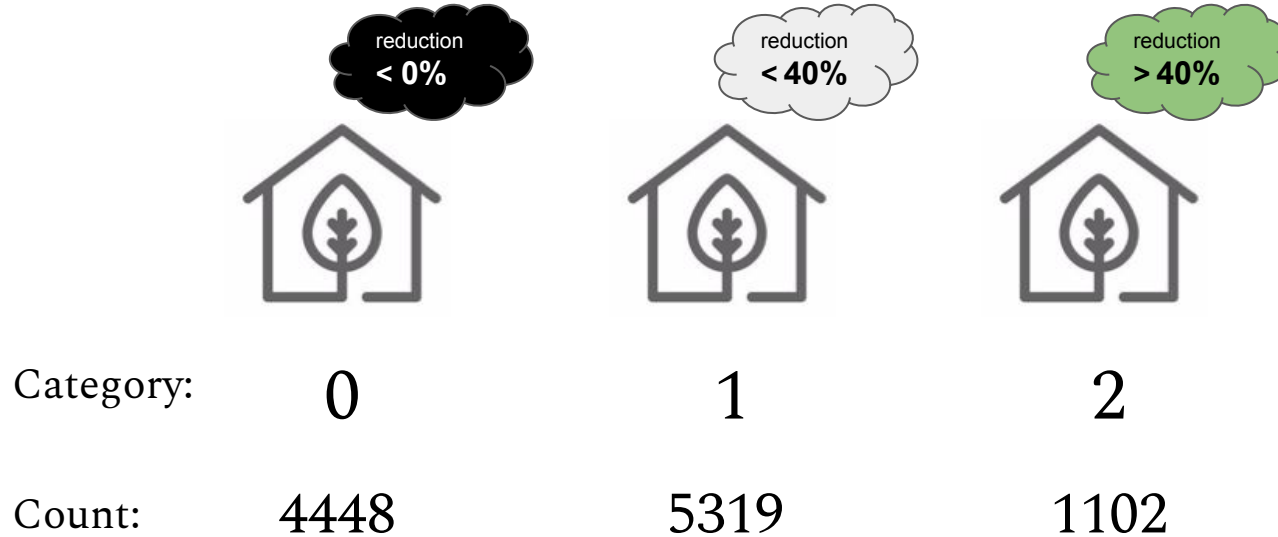
Research Question

What are the **important variables** that affect building GHG emission reduction at the tax lot level in New York City?



Target Variable

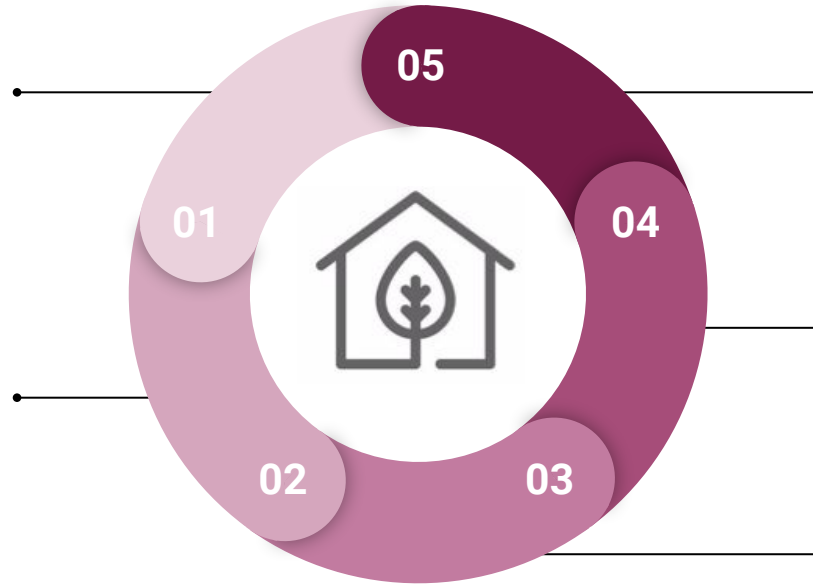
2012 - 2018 Total Greenhouse Gas Emission Reduction



Predictors

- Building Value**
- Assessed Land Value
 - Assessed Tax Lot Value

Energy Star Score



Building Type

- Largest Property Use Type
- Building Class
- Land Use

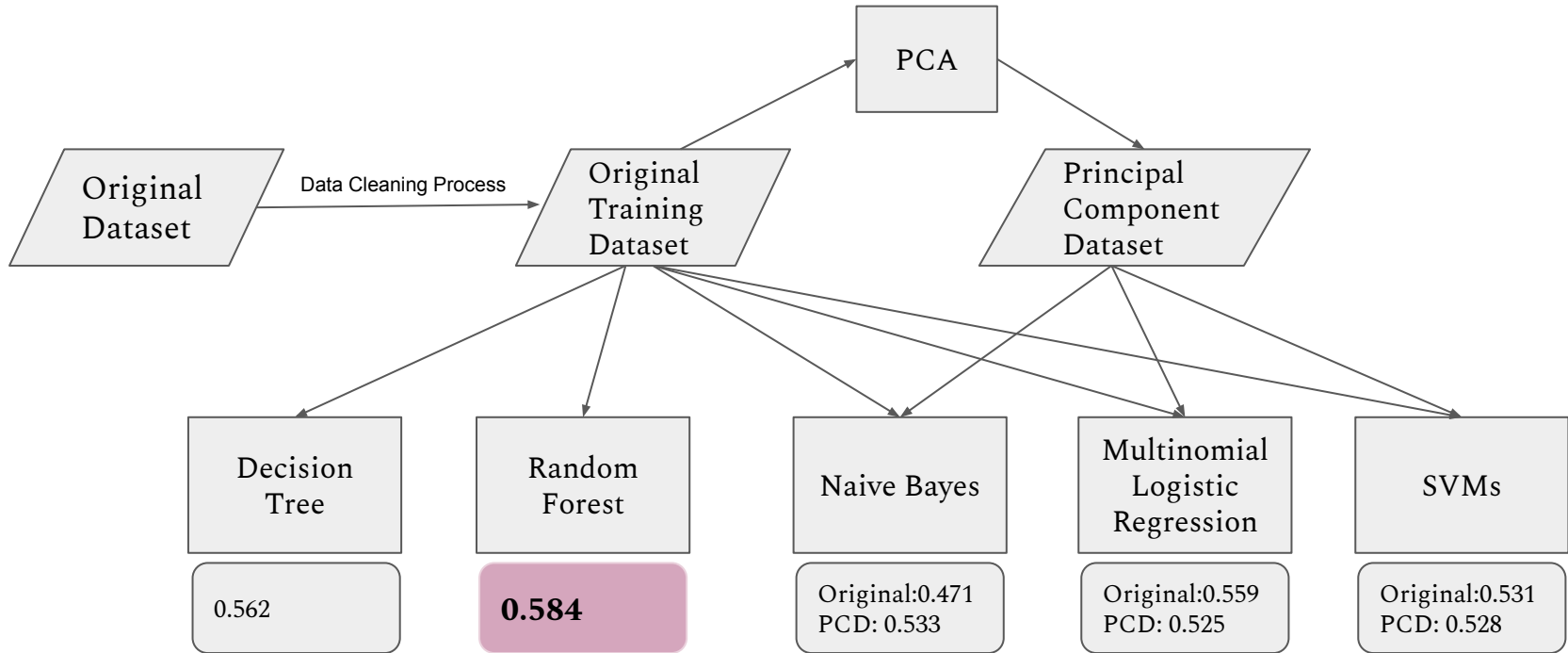
Building Area

- Property Floor Area
- Occupancy
- Building Area
- Number of Floors
- Area of different types of usage
- FAR

Building Age

- Year of Construction Completed

Methodology



WINNER!

Conclusions

Q

What are the **important variables** that affect building GHG emission reduction at the tax lot level in New York City?

A

1. Energy Star Score
2. Property Floor Area
3. Floor Area Ratio
4. Assessed Total Value
5. Building Age



Conclusions

Q

Which Buildings will Meet the GHG Emission Reduction Goal of NYC?

A

1. **HIGH** Energy Star Score
2. **LARGER** Property Floor Area
3. **LARGER** Floor Area Ratio
4. **HIGHER** Assessed Total Value
5. **SMALLER** Building Age



Planning Implications

Identify important predictors for
housing emission reduction
measurement



Energy Star Score !

Allocation of GHG emission
allowance

Small Old Buildings of Low Value
and Low Energy Star Score



Limitations

1. Low Machine Learning Model Performance
2. Large Number of Trees and Depth might be Overfitting

THANK YOU

