Using Open Data to Predict Energy Usage

What tax lot data can tell us about energy usage intensity in New York City

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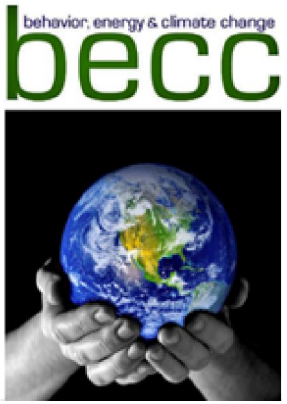
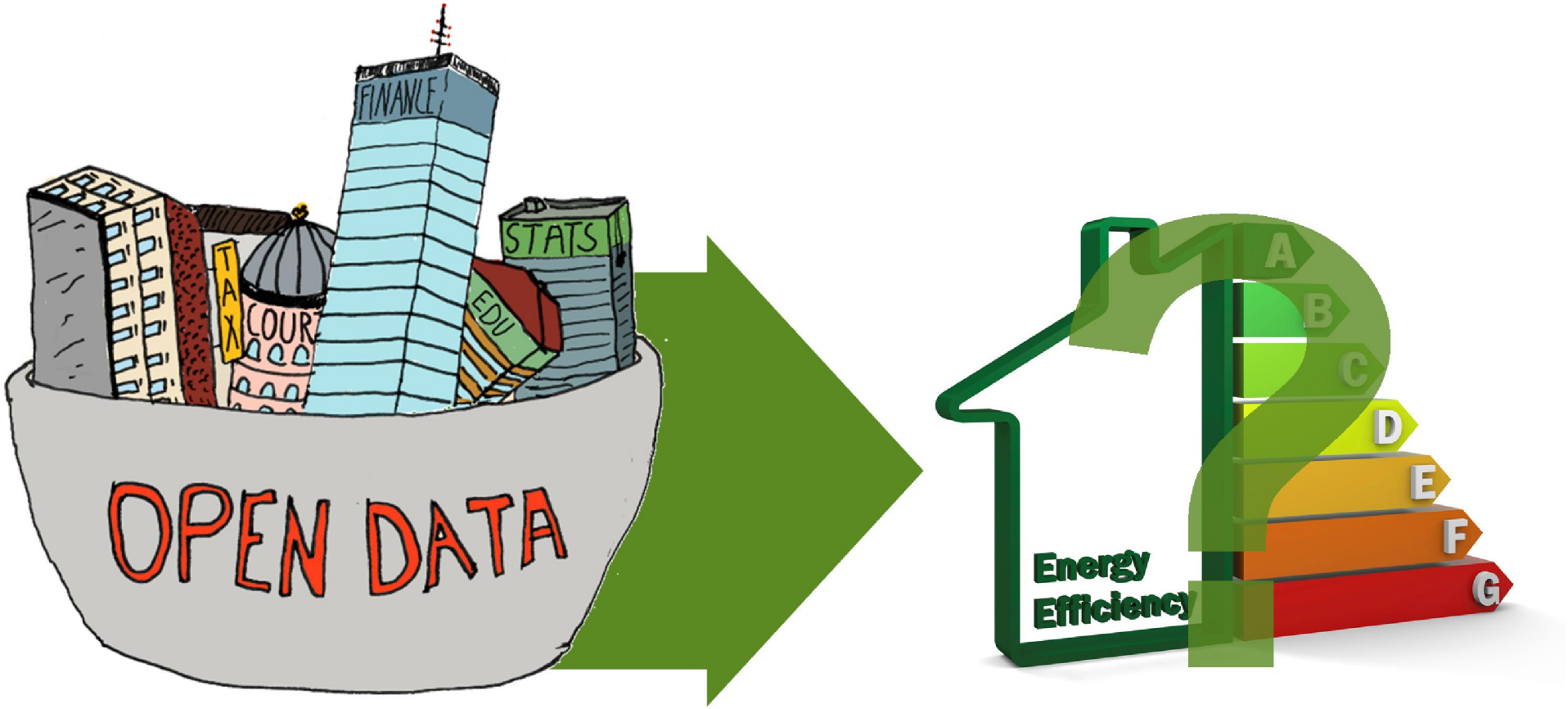
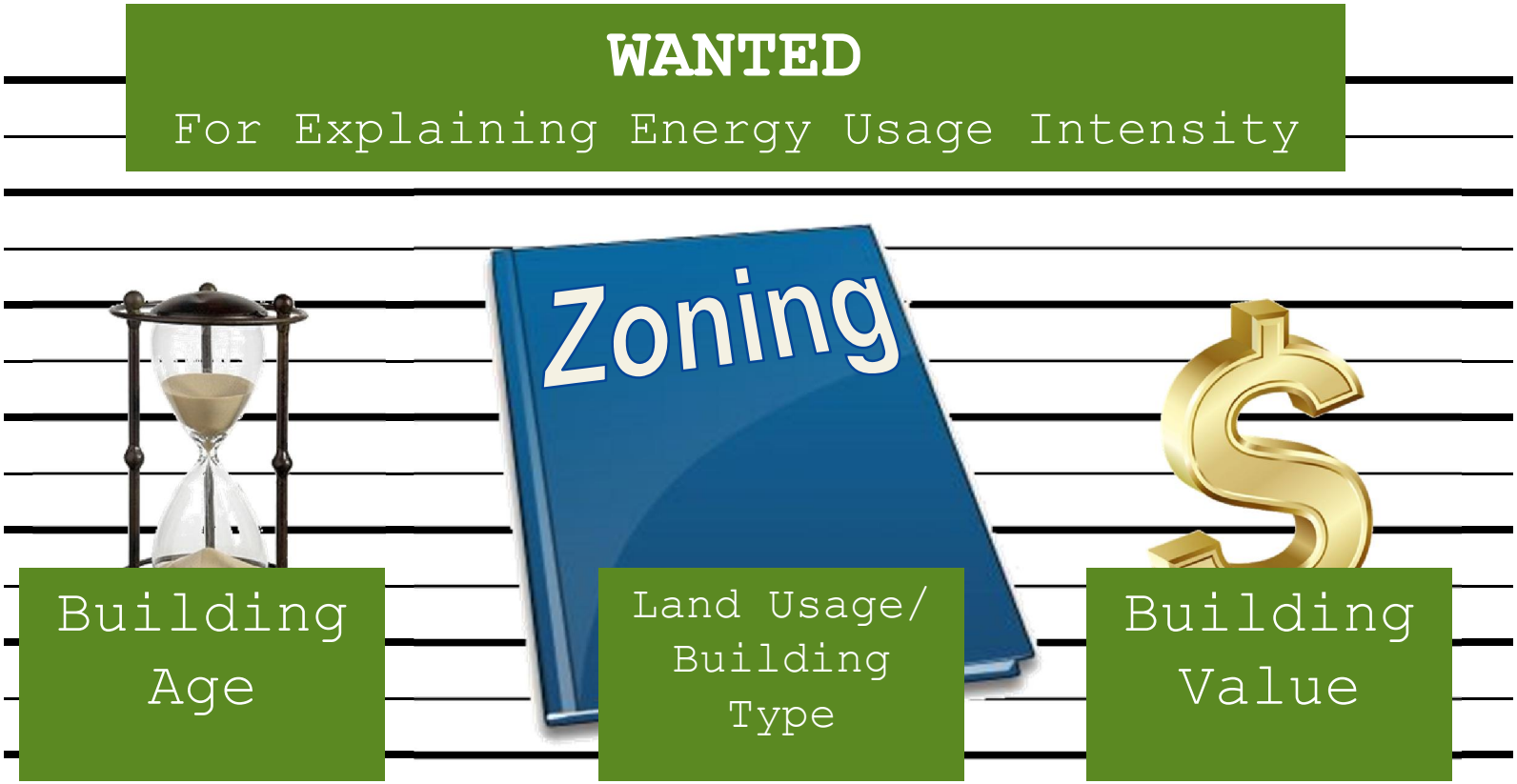


What can all this data tell us about how we use energy?



It's the Usual Suspects



But that's only part of the story…

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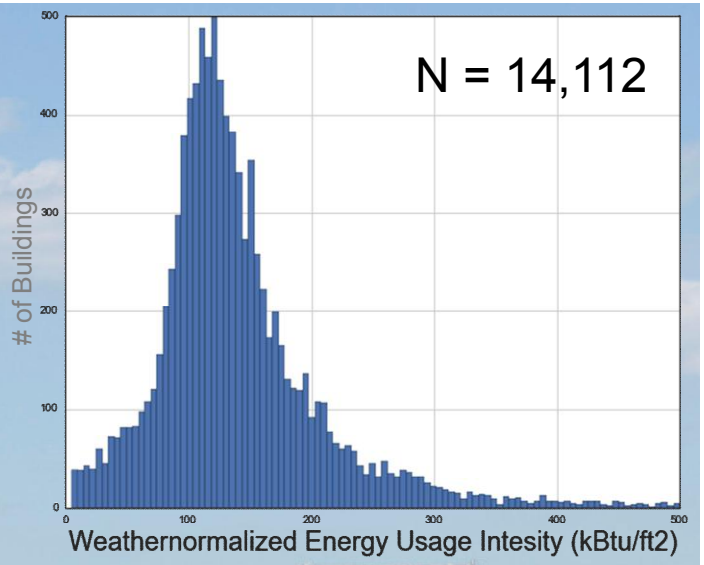
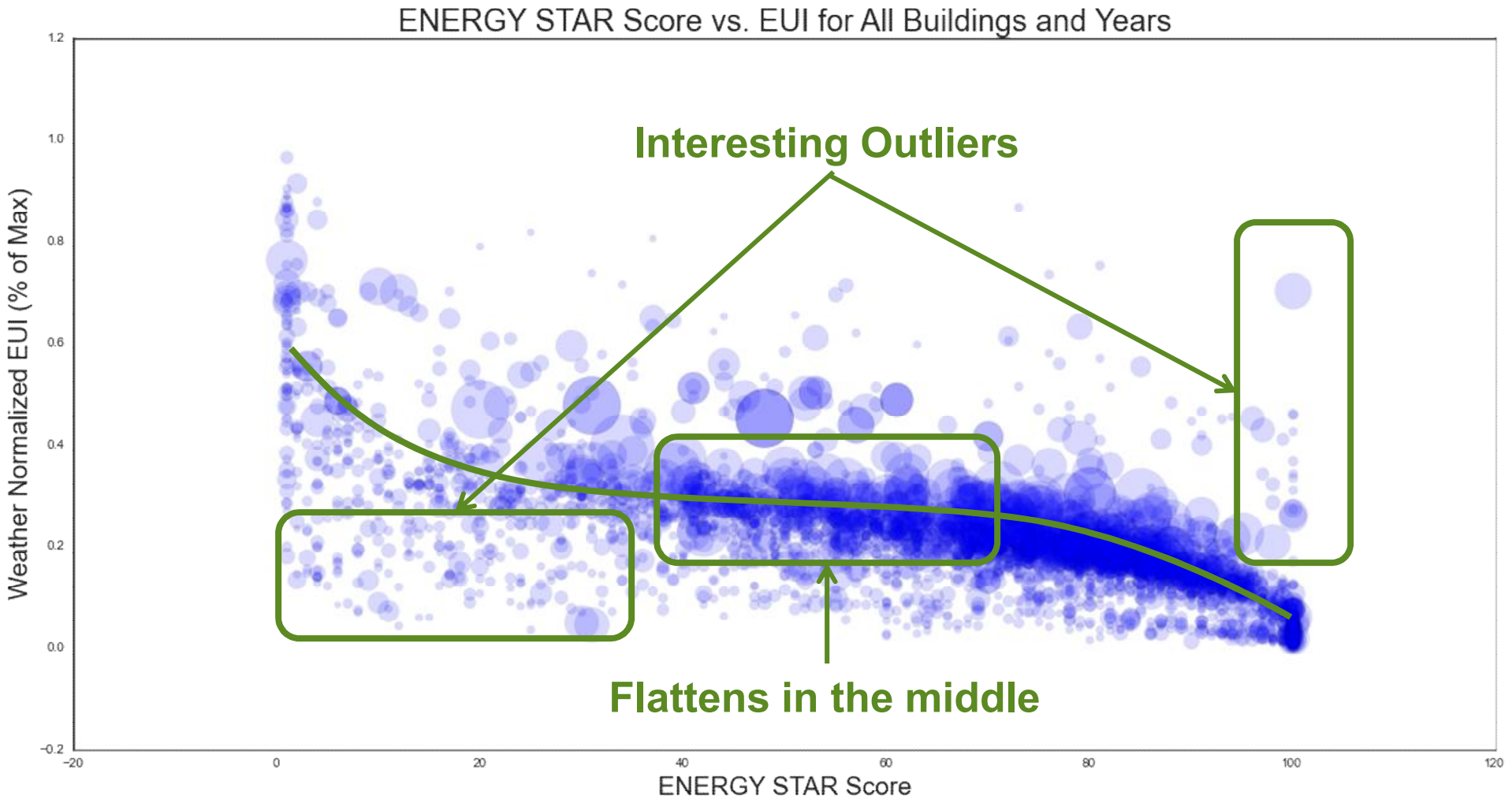
Local Law 84


N = 14,112
# of Buildings
0
100
200
300
400
500
Weathernormalized Energy Usage Intesity (kBtu/ft2)

Existing Benchmarks



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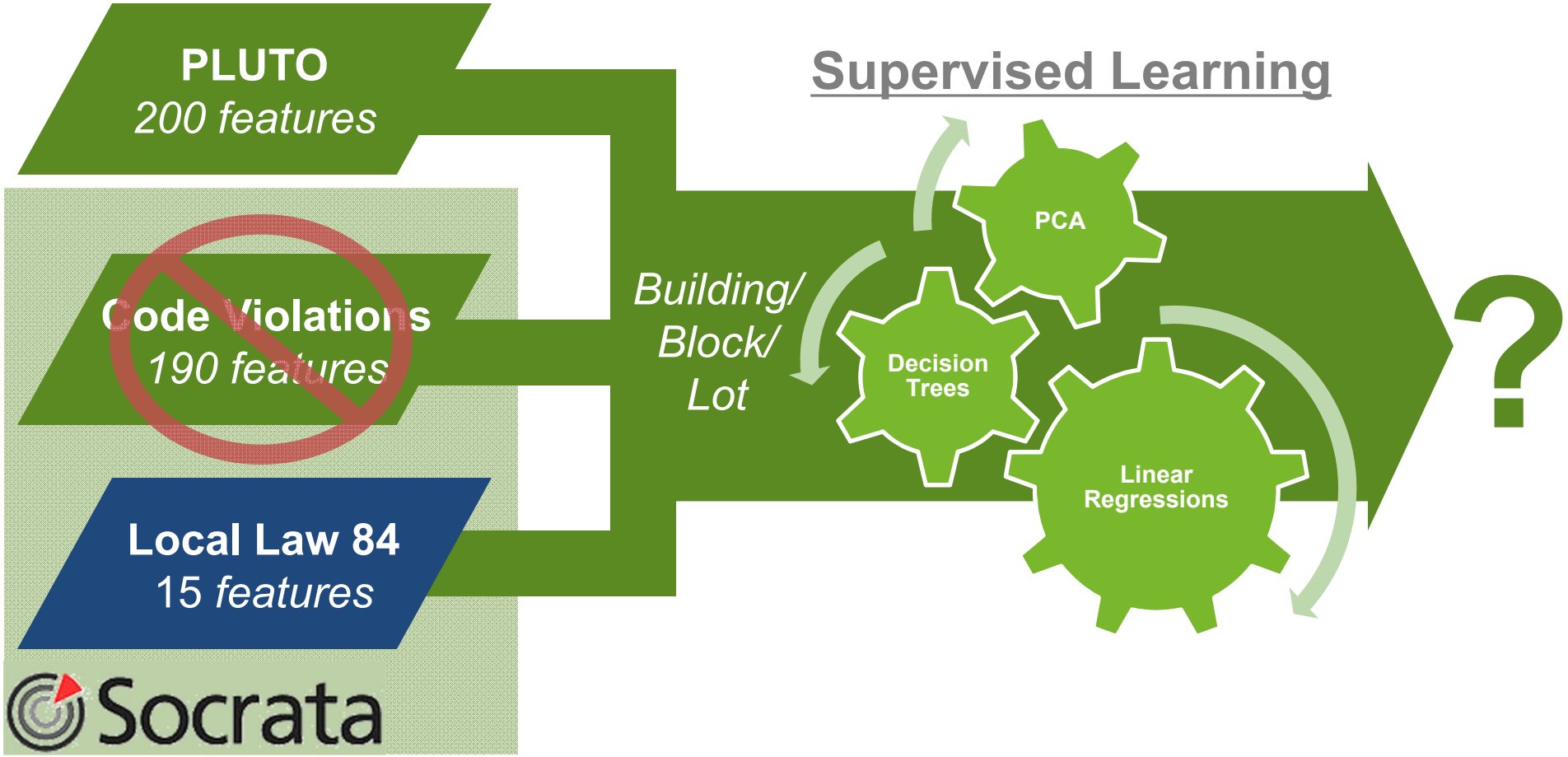
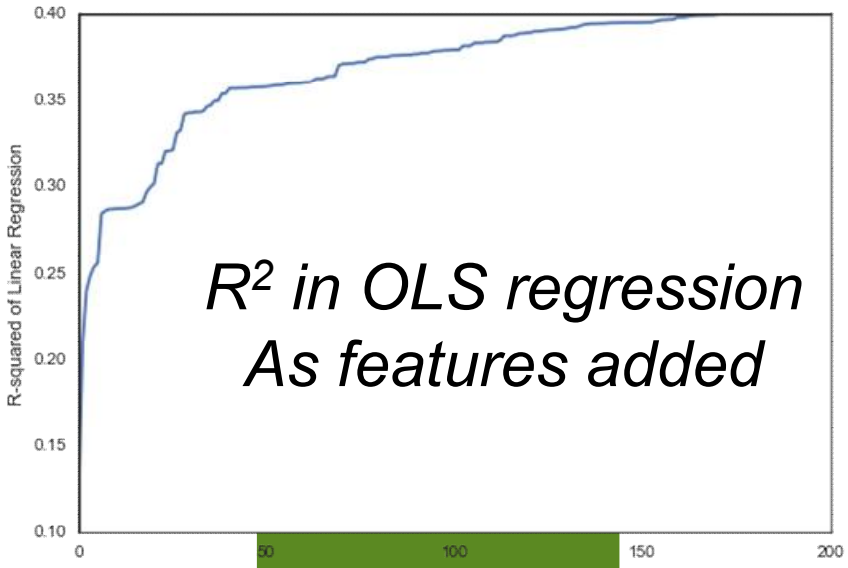
Going Further with New Data



What Was Found?



Cross-validation

Gini Importance

Tier 1 Features

- Is it a hospital?

Tier 2 Features

- Is it an office?
- Year built

Tier 3 Features

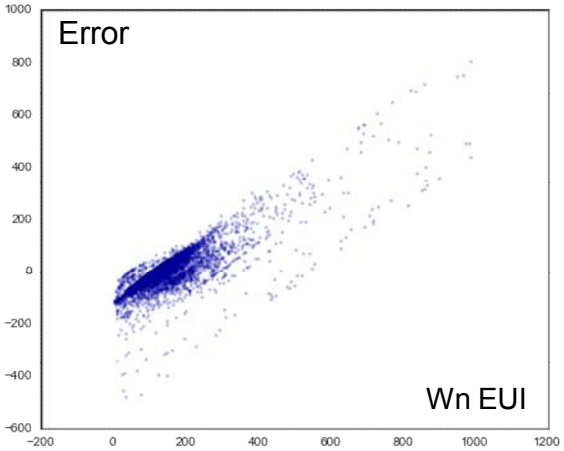
- Value of building/land
- Year of last renovation
- Building size/usage type

Best Model: Random Forest Regression

R^2 from 23% to 29% with standard deviation ~3%

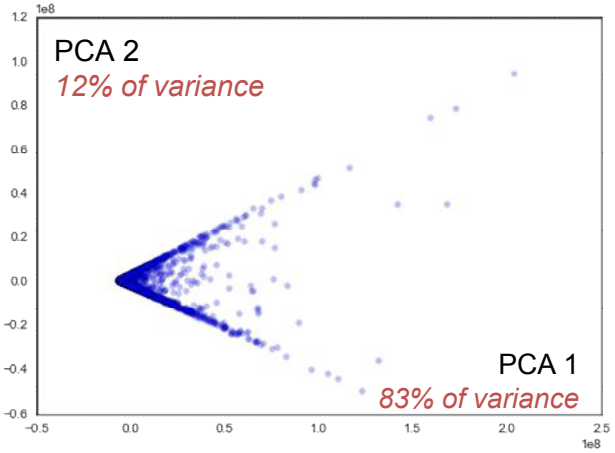
Hints in the Data

Residuals



- Clear linear relationship
- Further classification striations

Primary Component Analysis



- Collapses to two main features
- First component explains vast majority of variance

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What Does it Mean?

- Around **30%** of variance explained by features in PLUTO
- **Sub-sector** analysis **crucial**
- Type **>** Age **>** Value **>** Size

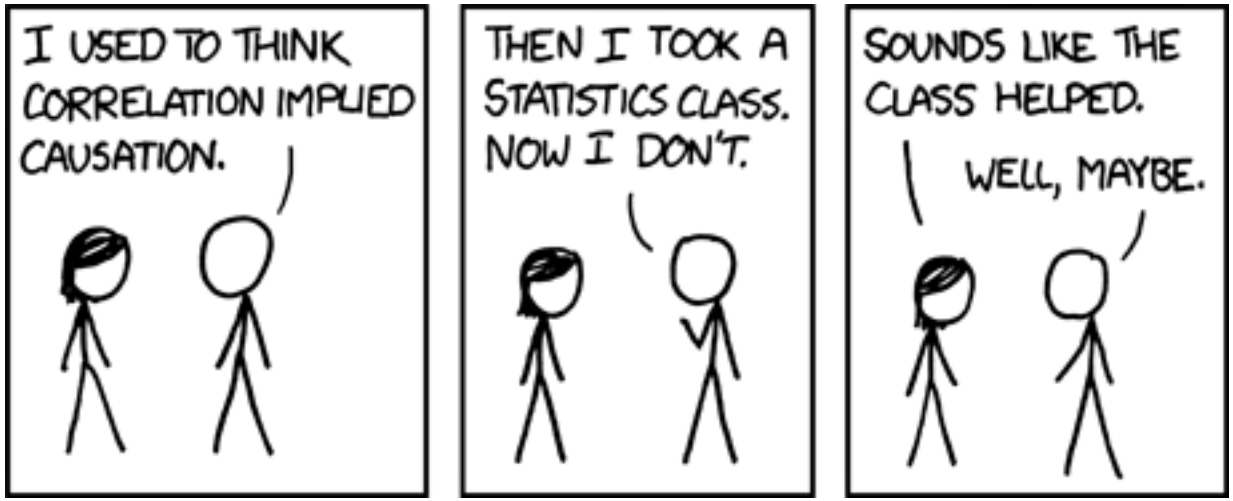
What Now?

- **White paper** with additional details
- **Predicting** out of sample (new years)
- Bring in **more data** to improve model
- Applying and examining in **new areas**

"*Large repositories of public data can help improve our understanding of energy usage.*"

» Digging for **efficiency opportunities**

- Significant features could show hidden usage drivers
- Outliers may mean opportunity



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