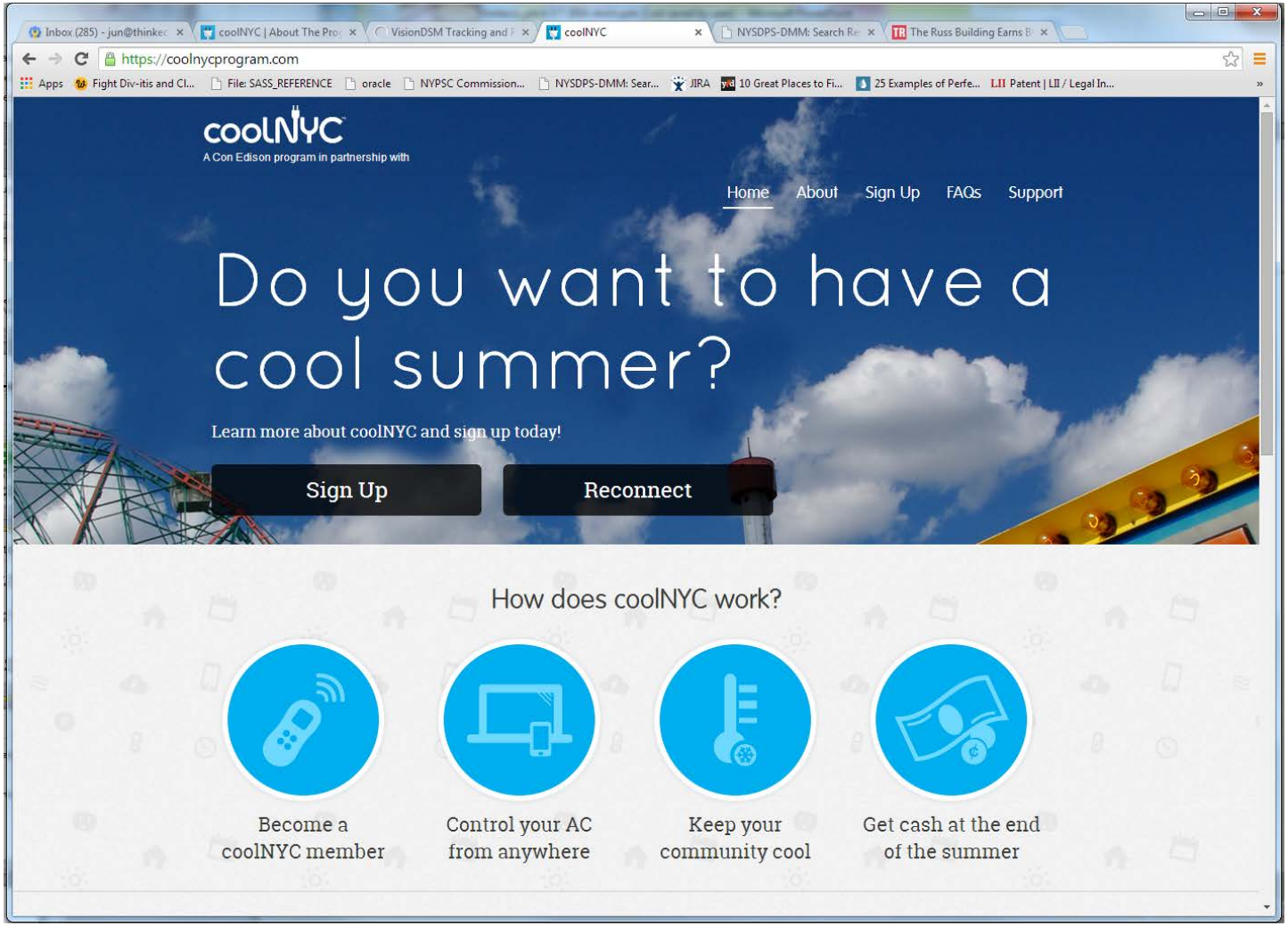
Broadening Demand Response Through Technology and Data Analytics

Jun Shimada

thinkeco

coolNYC is a residential DR program focused on window ACs



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Data subject to adjustments

coolNYC is a data-driven program

- M&V is built into the hardware
  - *Power is monitored in real-time*
- Customer behavior is monitored as well
  - *Temperature settings*
  - *Opt outs*
- Proprietary data analytics platform
  - *Can be applied to any reliable data source*

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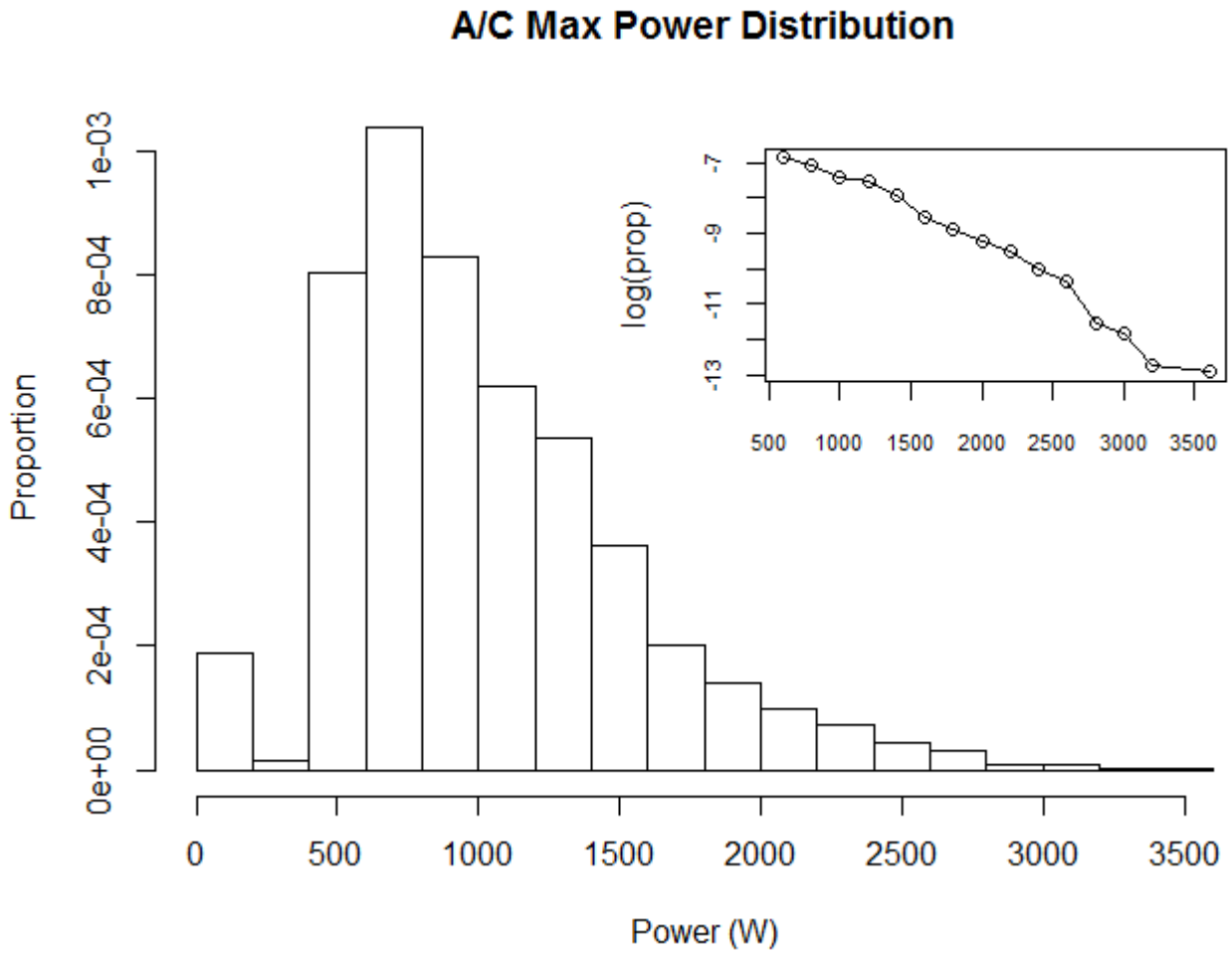
What does the 2013 data tell us?

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Window A/C power distribution is broad

Exponential tail

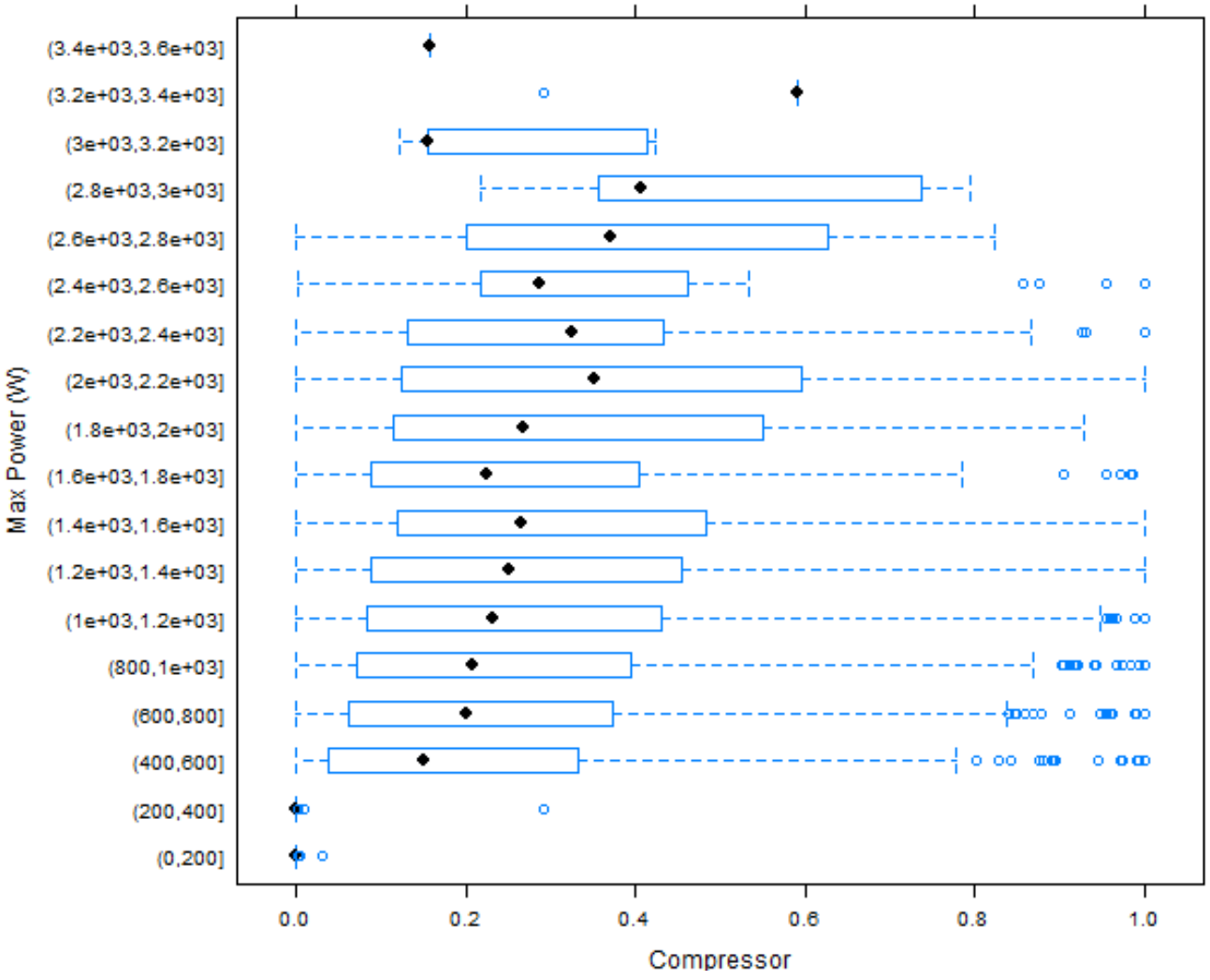
"A lot of bad window ACs are out there"



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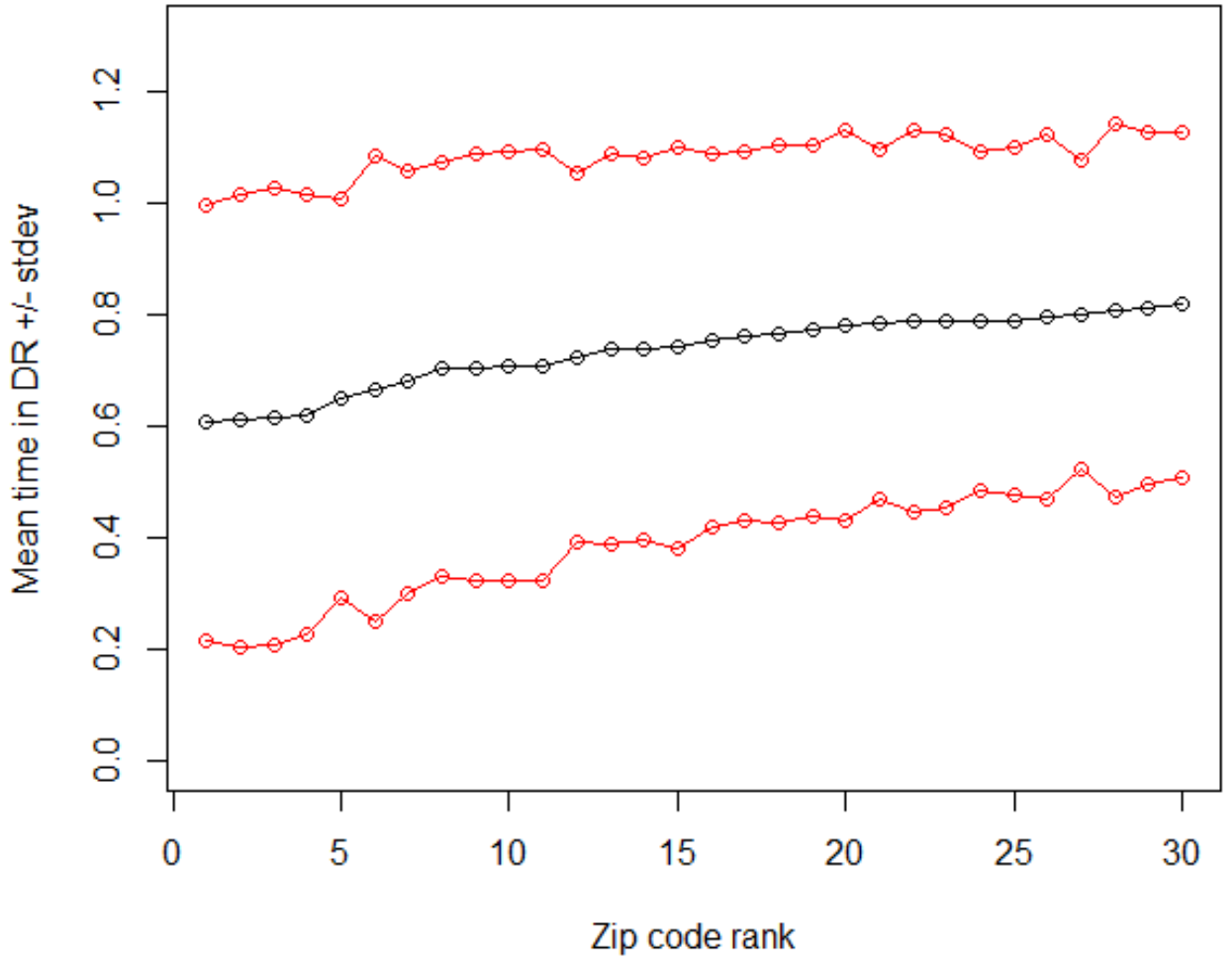
Three ways to profile ACs

1. Measured Max Power
2. Cycling
3. DR time



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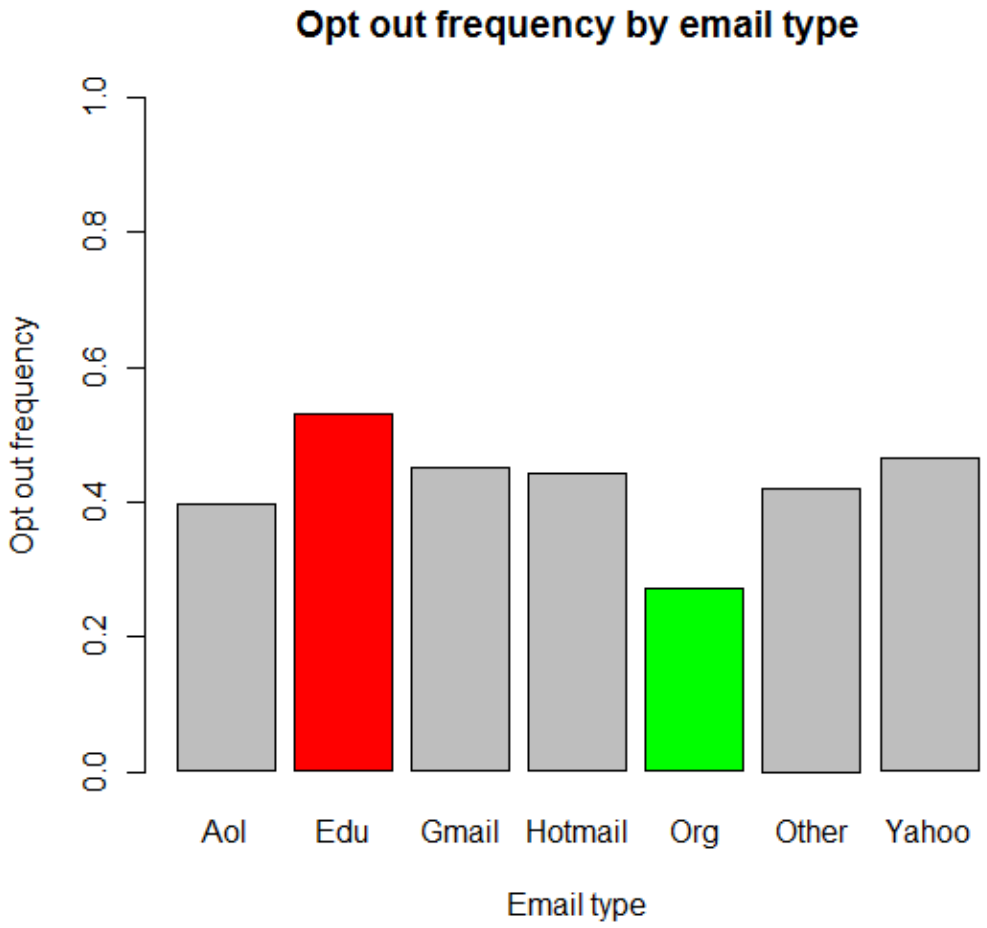
Some zip codes show better DR performance



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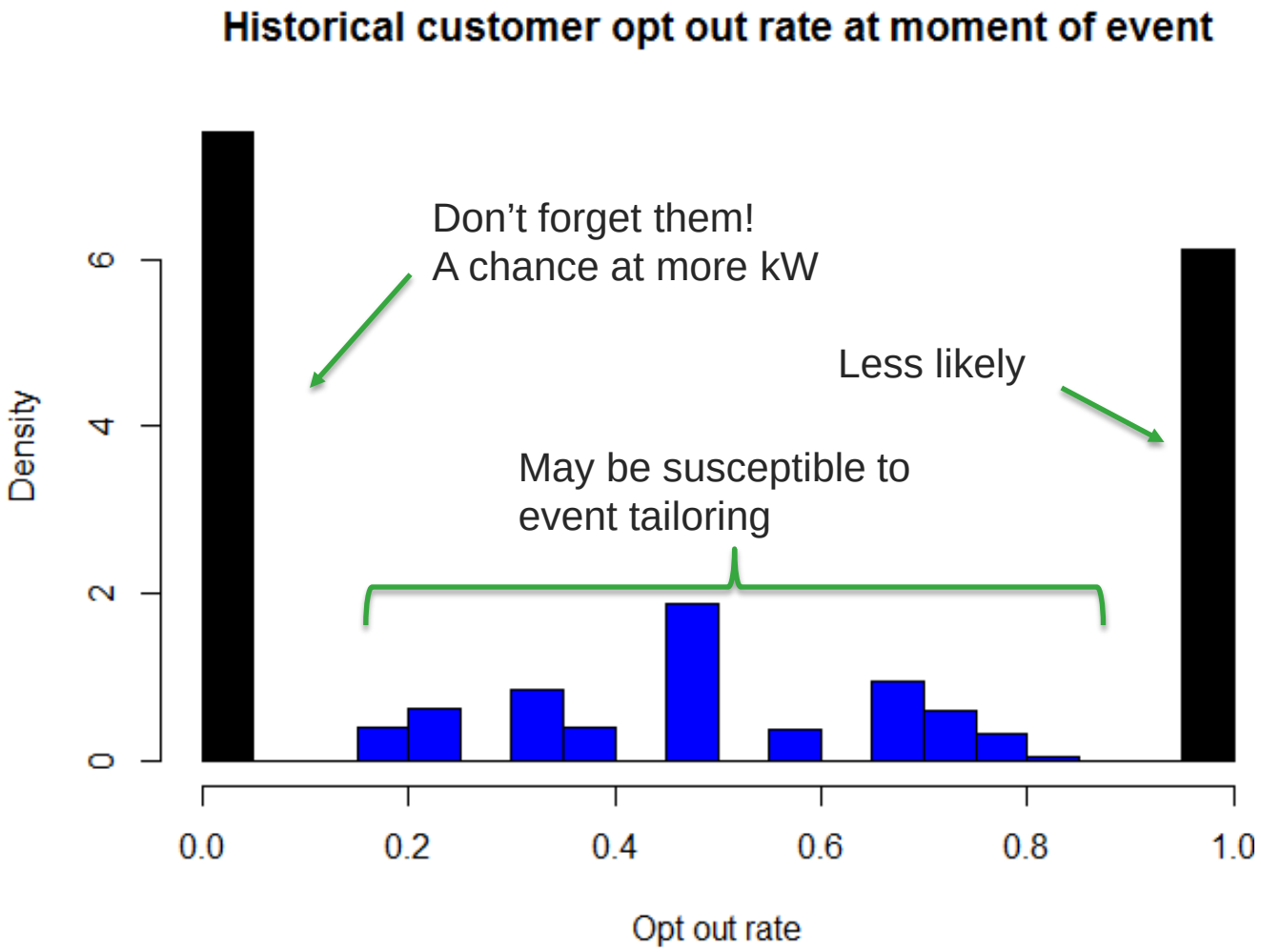
Fun fact: email is an indicator of DR performance!

- Students apparently perform worse then non-profit workers!



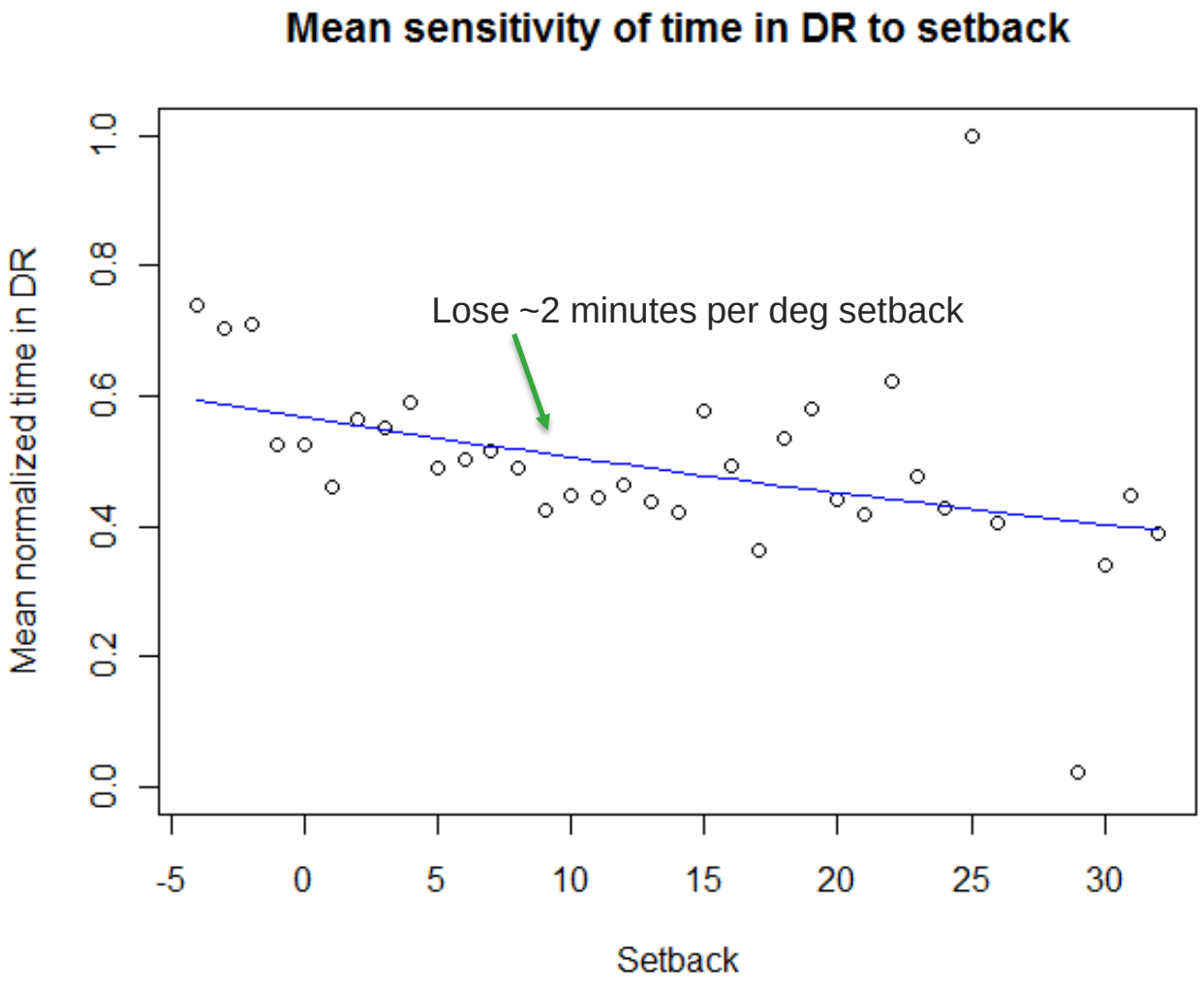
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Three DR opt out populations exist

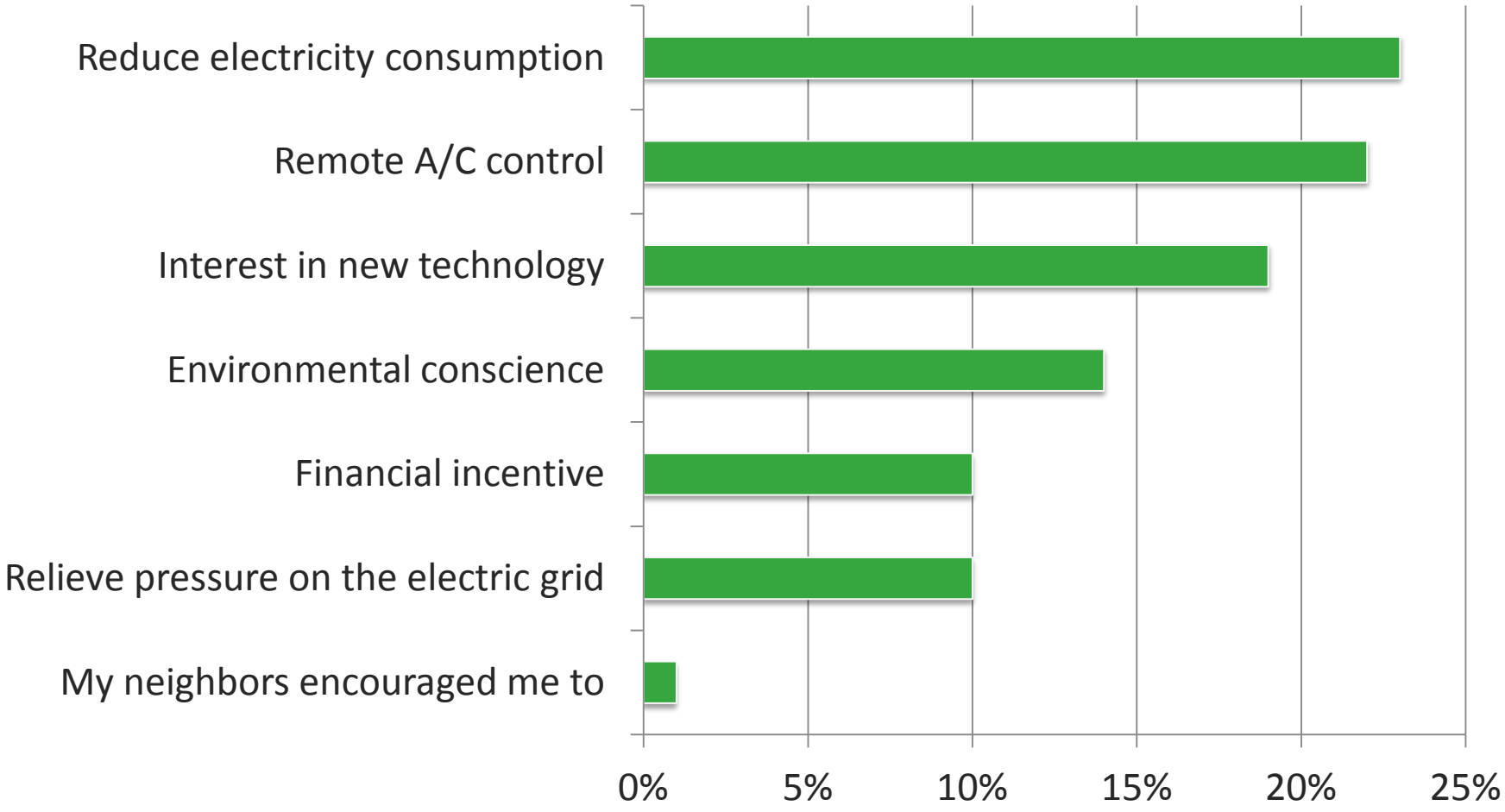


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Setback vs DR opt outs



2013 survey results show $ is not important!



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What we learned from 2013

- Customers are looking for a varied engagement experience
  - *Opportunities for marketing to go beyond "saving energy" or "saving money"*
- Customers have DR profiles
  - *ACs can be characterized by size, cycling probability*
  - *Customers respond differently to setbacks*

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Two goals in 2014

- Engage customers better
  - *Can we provide a DR experience that is more valuable to the customer than a fixed $ incentive?*
- Personalized DR
  - *Can we reduce the number of opt outs?*
  - *Leverage big data, software, and IP addressible hardware*

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In 2014, DR gamification to incent customer performance & engagement

- coolNYC 2048 (with Cornell University)



- Rewards points (with Rakuten)



- Performance based contests



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2014: Personalized DR

- Given *all available info on customer at moment of event* create a customer profile
  - Probability of opt out?
  - Expected time in DR?
  - Sensitivity of compressor activity and opt out risk to setback?

- From prediction to event calling
  - Predictive and sensitivity models enable customer-specific optimization of event parameters to maximize load reduction

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