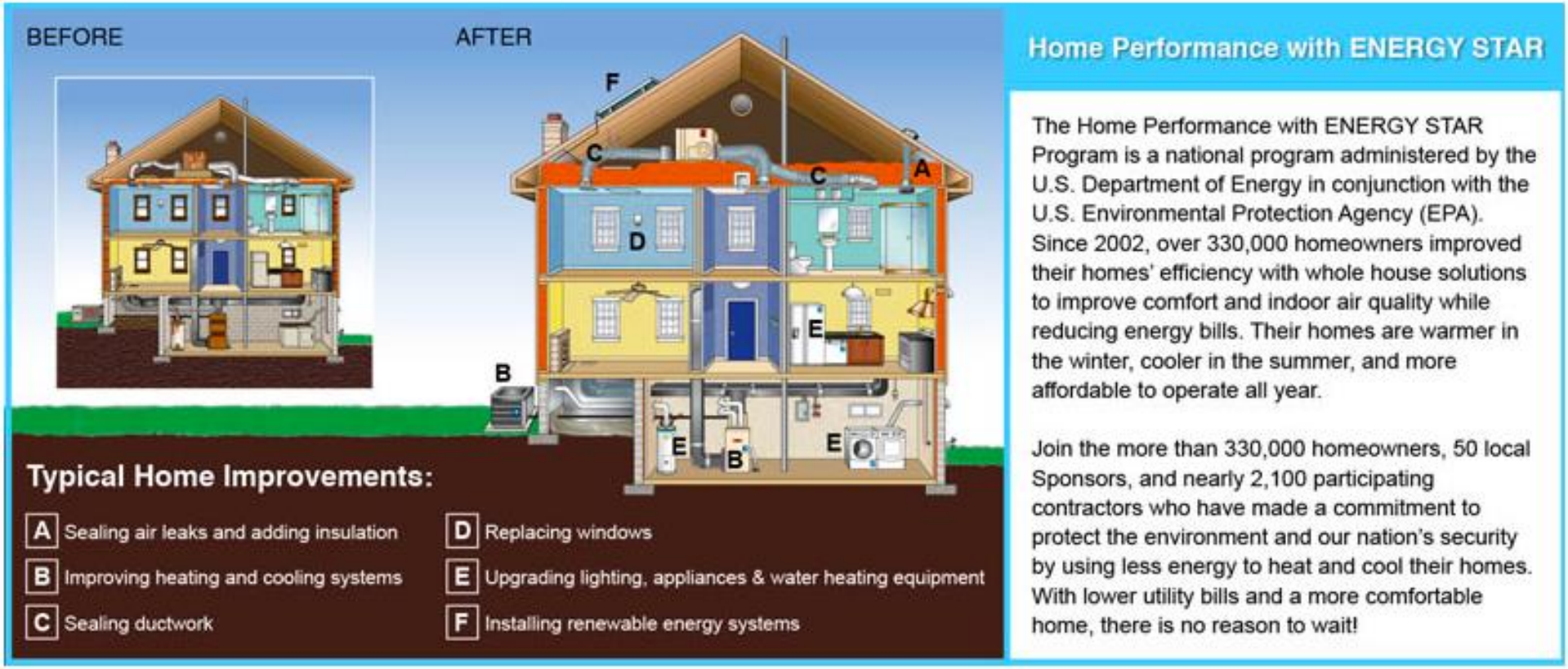
Residential Shell Retrofits, ***biggest*** savings potential



About 50% of homes need it.

<u>Building shell</u> improvements.

Clear benefits: Positive NPV. (SIR> 1.0) Better comfort.

Let's be honest: Residential retrofits are not easy: retrofits scare consumers and people aren't buying

- "None of my friends have had a retrofit". (1-5% adoption, out of 50%)
- Spend $10,000, nothing guaranteed.
  - Deemed savings/billing analysis solves the regulator problem, but not the contractor/individual's risk problem.
- Skeptical: 4-hour "audit" seen as a sales tool.
- ***DIRTY SECRET: RISK!***

In billing analysis,
1 in 6 homes save
LESS THAN ZERO.

STORY: CA state Assemblymember Nancy Skinner saved zero:

At LBNL she said
"We gotta make sure this works!"

Figure 3.1. Histogram of Percentage Consumption Differences for Sample A

At Cornell, we asked: can we do better?

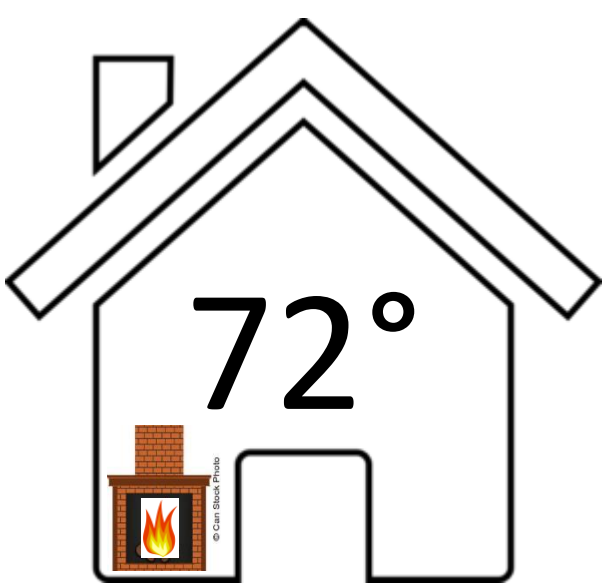
Criteria

- Identify the leakiest 50%
- Easy
- Inexpensive
- **Useful** **(Not perfect/precise)**

  Enough Signal-to-Noise to find the worst 50%

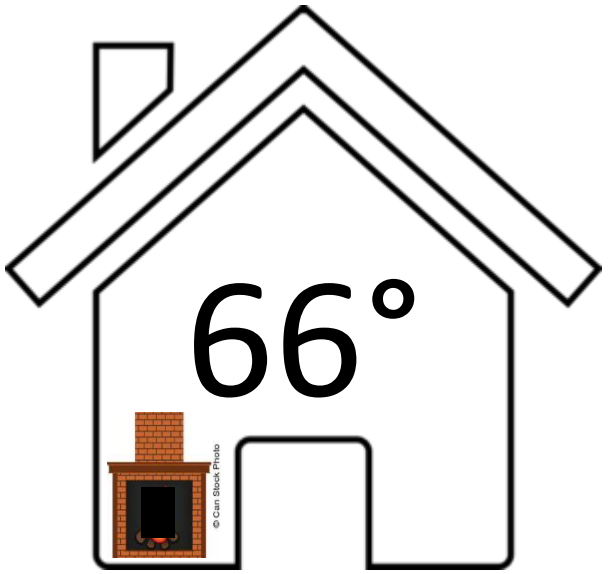
Answer: Mix 1970's Twin Rivers project with 21st century analytics. Mix of old & new.

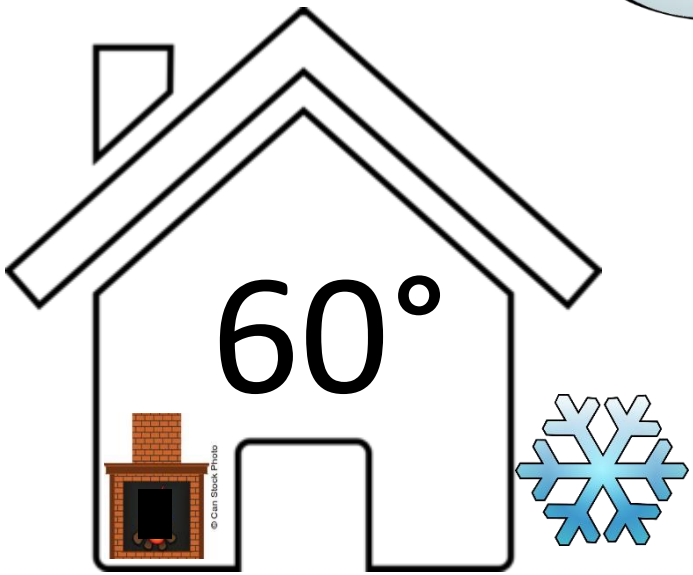
Two similar looking houses. One is leaky. How can we tell?



Two similar looking houses. One is leaky. How can we tell?

1970's answer: When everything is off, the leaky house drops temperature faster.





3 hours later

Physics never goes out of fashion:
Still true today. What's different is that now we have uber-cheap analytics.

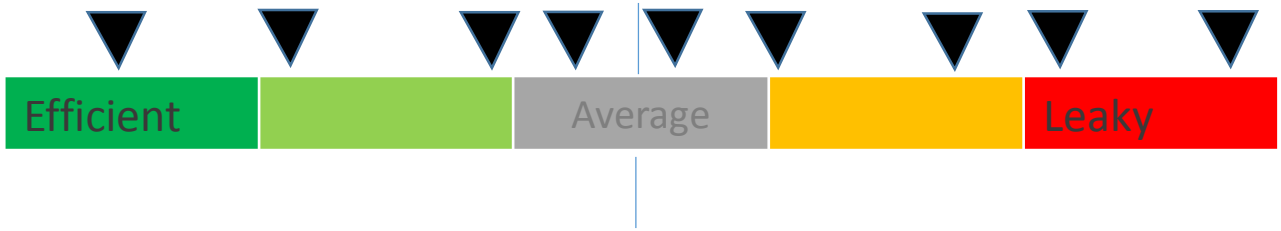
Cornell research project is

low-tech + high-tech

dataloggers

algorithms

$5



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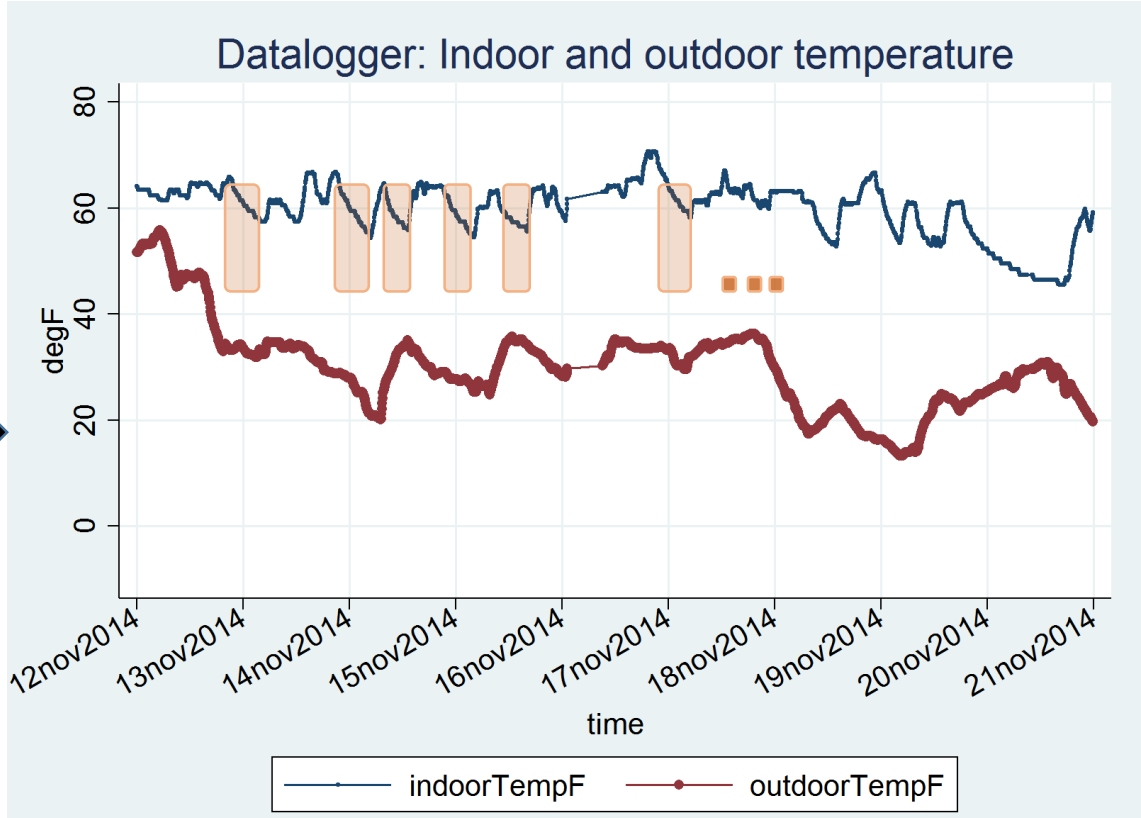
How it works. Easy!

Put in the house for 15 days during the winter & push 1 button.

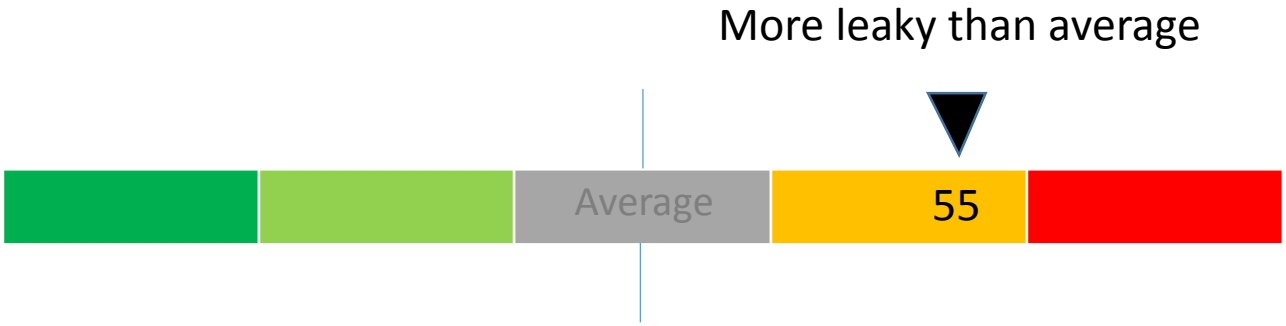
Easy: Nobody needs to enter your house. No scheduling 4 hours walkthrough.



"Low tech" – off-the-shelf

"High tech" – Building Physics – It works!
(LBNL, 1-hour talk)

Borrowing from O-Power
Easy Social Comparison drives action



Your Leakiness Score is 55.

Take advantage of government programs to help you save energy, improve your house, and increase your comfort.

Call to Action: Existing audit/retrofit process

HOME PERFORMANCE WITH ENERGY STAR

snugplanet

GET YOUR GREENBACK TOMPKINS
TAKE A STEP TO SAVE MONEY AND ENERGY

HALCO

Story #1: Leveraging existing civic institutions

Trust and Getting to $5 cost

Local champion owns the project. Data download, promotion

And bypass regulatory processes!

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Story #2: Beyond targetting
Good contractors will use it

My contractor
loves the datalogger.

Q: What's the **biggest** problem
does this solves *for the contractor*?

A: Callbacks!

Immediate quality control.
(2 weeks pre, 2 weeks post; mailed datalogger)

- Enable **acceptable** pay-for-performance & guarantees (DIAN) makes sense to the contractor
- Differentiation for the **good** contractors (RICHARD KAUFMAN – ENABLE MARKETS)
- Feedback. (REGULATORS & CONTRACTOR)

$5

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And there’s more….

100% Energy Code Compliance

(nudge nudge to Nest, Ecobee, Weatherbug)

Use Temperature Decay Curves for 10X better residential energy code compliance

Did you know… ?

Every energy code building simulation calculates Annual Consumption *and Temperature Decay Curves.*

Step 1: $5 measurement of temperature building decay curves.

Before the drywall goes up (because that's when it's cheap to fix).

Ramp Test: Ramp to 75degF (or 60degF in Texas), datalogger.

Step 2: Done.

10X better energy code (shell) compliance.
Skip to variability of building inspectors.

Research is working ***today!***

In the field now…

By February 2016:

- 500 homes
- Open source algorithm
- Open source 500 anonymized data sets

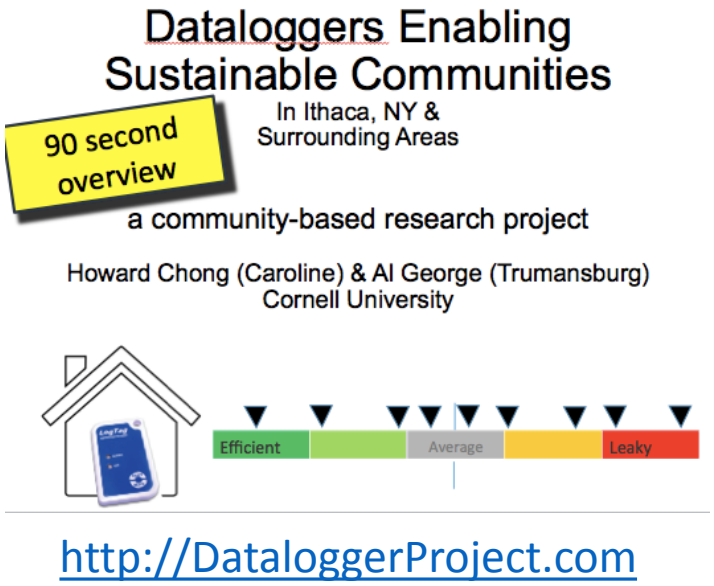
By 2018, all of Ithaca (50,000 population) scored.

- Enables targeting, physical baseline.
- Amazing community engagement

Lots of fun discussions with libraries, boy scouts / girl scouts.
Zero discussions with regulators

Next Steps

- **Email me today** and you will get the 500 traces of data, algorithm, and deployment lessons learned.
- If this solves an existing engagement problem for you, let's see if we can work something out. It's "shovel ready" today.



http://DataloggerProject.com

Thank you!