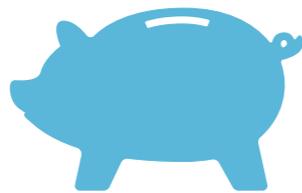# How to Inspire Confidence with Machine Learning, Finance, Insurance, and Real Time Metering

Lauren Salz, Sealed

May 22, 2018

We are a financial and energy technology company that develops investment-grade energy savings predictions to provide:
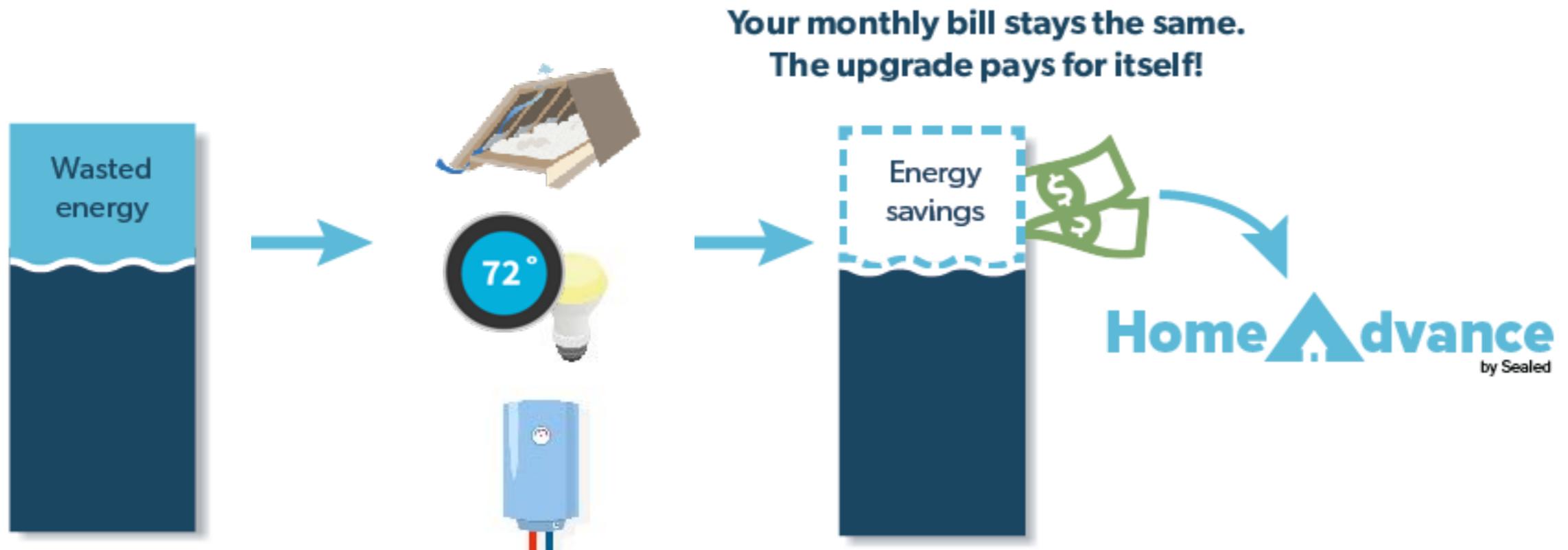
Affordable home energy upgrades for homeowners

Insurable, investment-grade cashflows for banks

Achievement of efficiency goals for utilities

Get $6,500 in prepaid home upgrades!

We pre-pay to install insulation, thermostats, lighting and HVAC; the difference between your old and new bill covers the work

Your monthly bill stays the same.
The upgrade pays for itself!

Wasted energy

72°

Energy savings

Home **A**dvance
by Sealed

HomeAdvance marketing is out-performing industry standards

Audience engages at high rates all along the marketing funnel[1]

+2x Landing page conversion of 17%[2] is double industry "high" benchmarks[3]

+3x HomeAdvance marketing messaging performs 300% better than energy audit offer[4]

+2x Increase in close rate[5]

1. In 2018, 26% avg open rate, 3% avg CTR, 0.61% overall audience conversion
2. Average of utility referral landing page performance.
3. Unbounce 2017 Conversion Benchmark Report reported 7% as in the 75th percentile for home improvement industry.
4. With multiple partners Sealed has seen more than 3x increase in average conversion rate per email campaign with HomeAdvance messaging as compared to prior home energy audit / home energy consultation
5. Sealed internal data

" The reason we went with the [Sealed] HomeAdvance program was because it was backed up, guaranteed. And I said, 'well, okay, if they're doing this, everybody's gonna win.' And I think that's born to be true.
"

Charles C.

Rifton, NY

Value creation across multiple stakeholders

Unique vantage point across industry stakeholders

Banks
- Banks receive a long-term, high quality cashflow stream with large market potential

Insurers
- Energy savings insurance policy drives better financing terms by de-risking debt

Utilities
- Sealed increases customer adoption of efficiency measures while funding some or all of the upfront marketing costs


Installers
- Contractors dramatically increase conversion from audit to project (80%+) without the paperwork / complexity of a traditional program

Investment and insurance-grade accuracy key to private market actors

Sealed accuracy based on "Cross-Validation", which compares model predictions to out-of-sample results

Predicted vs. actual electricity usage (kWh)

Legend: Predicted (avg. kWh)   Actual (avg. kWh)
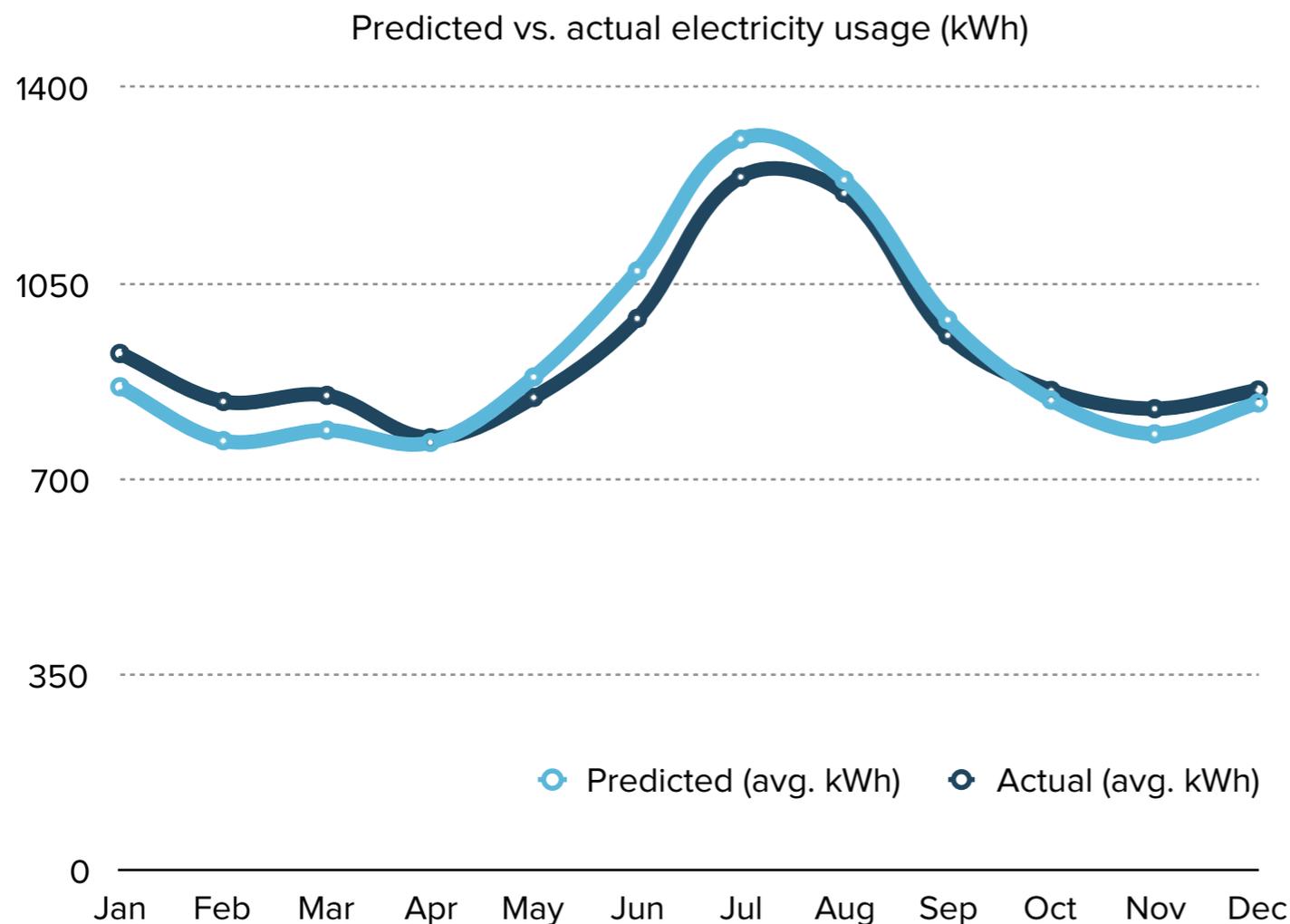
> *Utilizing HSB's portfolio underwriting approach to develop this new performance product, residential customers now have ready access to energy efficiency insurance that traditionally has been available only to large commercial and municipal customers*

Rick Jones
Hartford Steam Boiler

1. Percentage of annual predicted electricity usage compared to actual annual electricity usage in a population of homes in New York; n=338
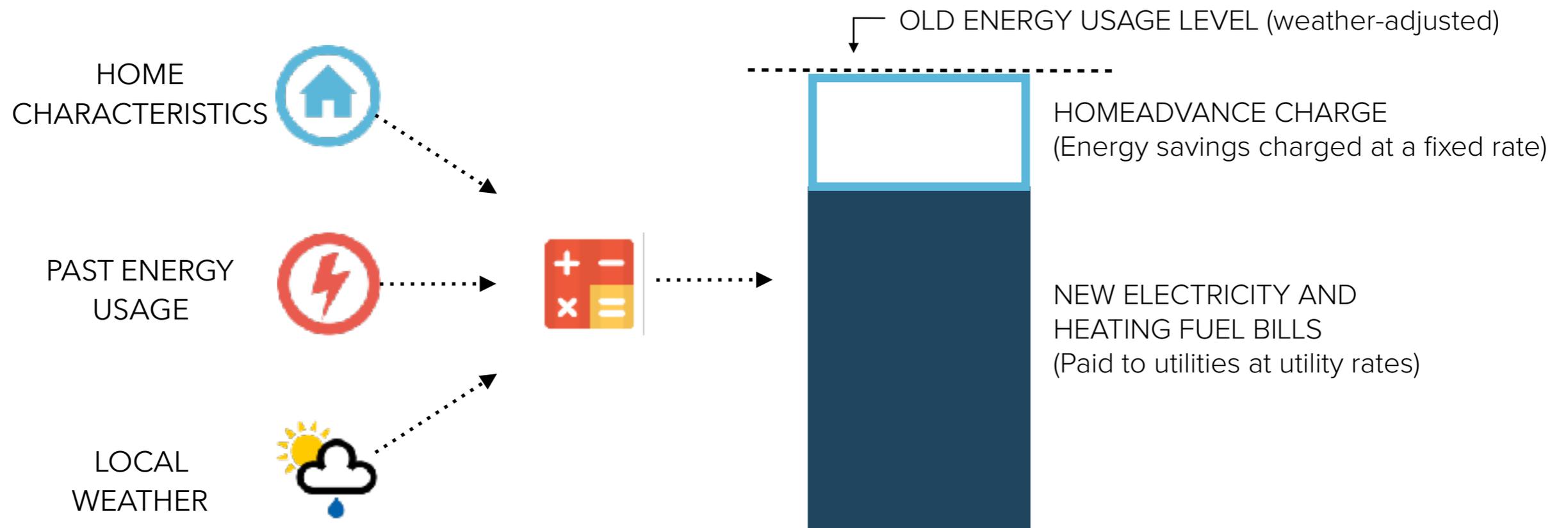
Cross-validation key to investment-grade energy savings predictions

Cross-validation allows Sealed to prove the predictive power of our models in ways typical engineering or inferential models are unable to
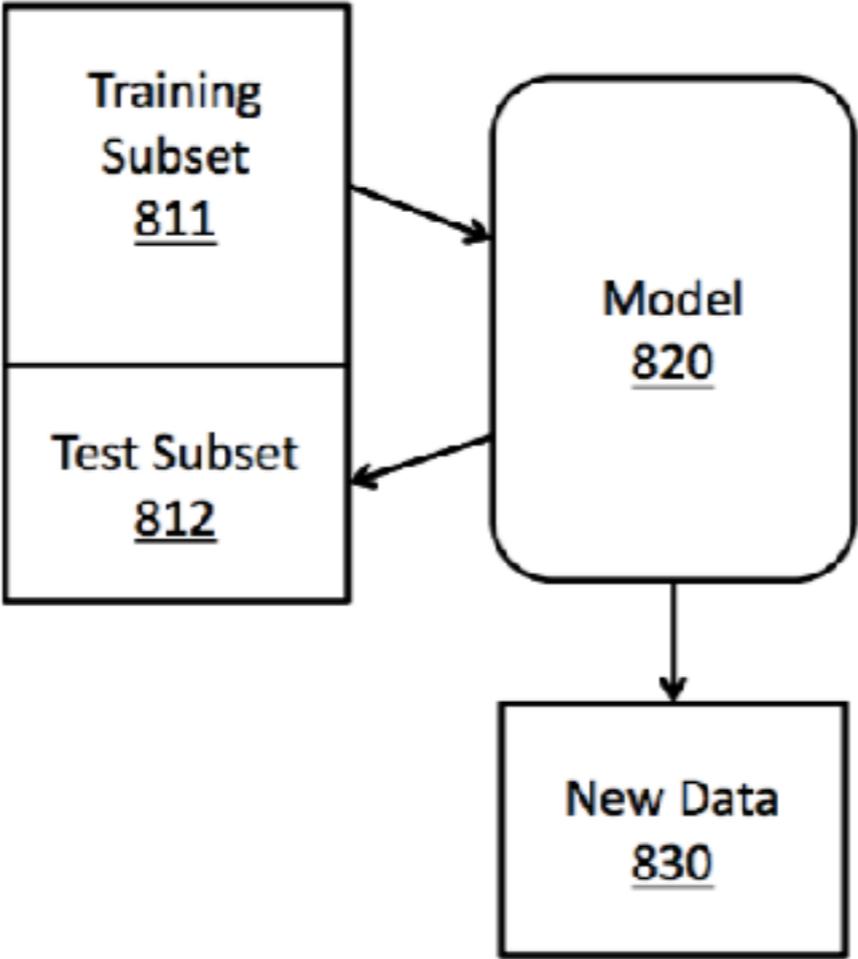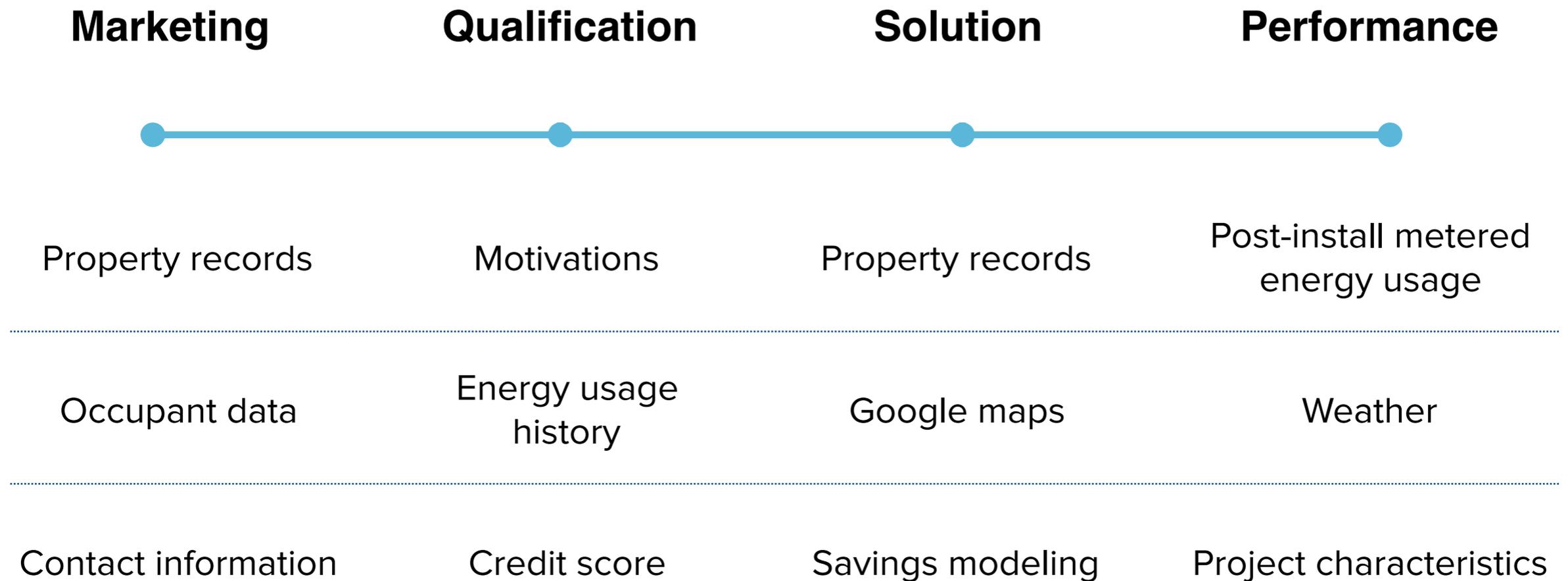
Energy savings defined by post-upgrade energy usage compared to past usage, adjusted for weather

Past usage disaggregated into simple co-efficients (usage per day, usage per degree day) based on home characteristics, customer demographics, and weather

HOME CHARACTERISTICS

PAST ENERGY USAGE

LOCAL WEATHER

OLD ENERGY USAGE LEVEL (weather-adjusted)

HOMEADVANCE CHARGE
(Energy savings charged at a fixed rate)

NEW ELECTRICITY AND HEATING FUEL BILLS
(Paid to utilities at utility rates)

Data is integral at every stage of the customer journey

Informs action from awareness, to education, to purchase, to performance tracking

Marketing	Qualification	Solution	Performance
Property records	Motivations	Property records	Post-install metered energy usage
Occupant data	Energy usage history	Google maps	Weather
Contact information	Credit score	Savings modeling	Project characteristics

Portfolio approach to energy savings predictions

- Sealed tests accuracy of test vs. training set data to determine whether a particular population of homes / upgrades can be predicted

- HomeAdvance qualifications increase as more homes / upgrades pass this test

- Accuracy increases based on size, quality, and diversity of data sets

- Post-upgrade energy usage compared to baseline energy usage to find predictive relationships in a portfolio of homes

Standard Deviation of Heating Oil Savings Realization Rate
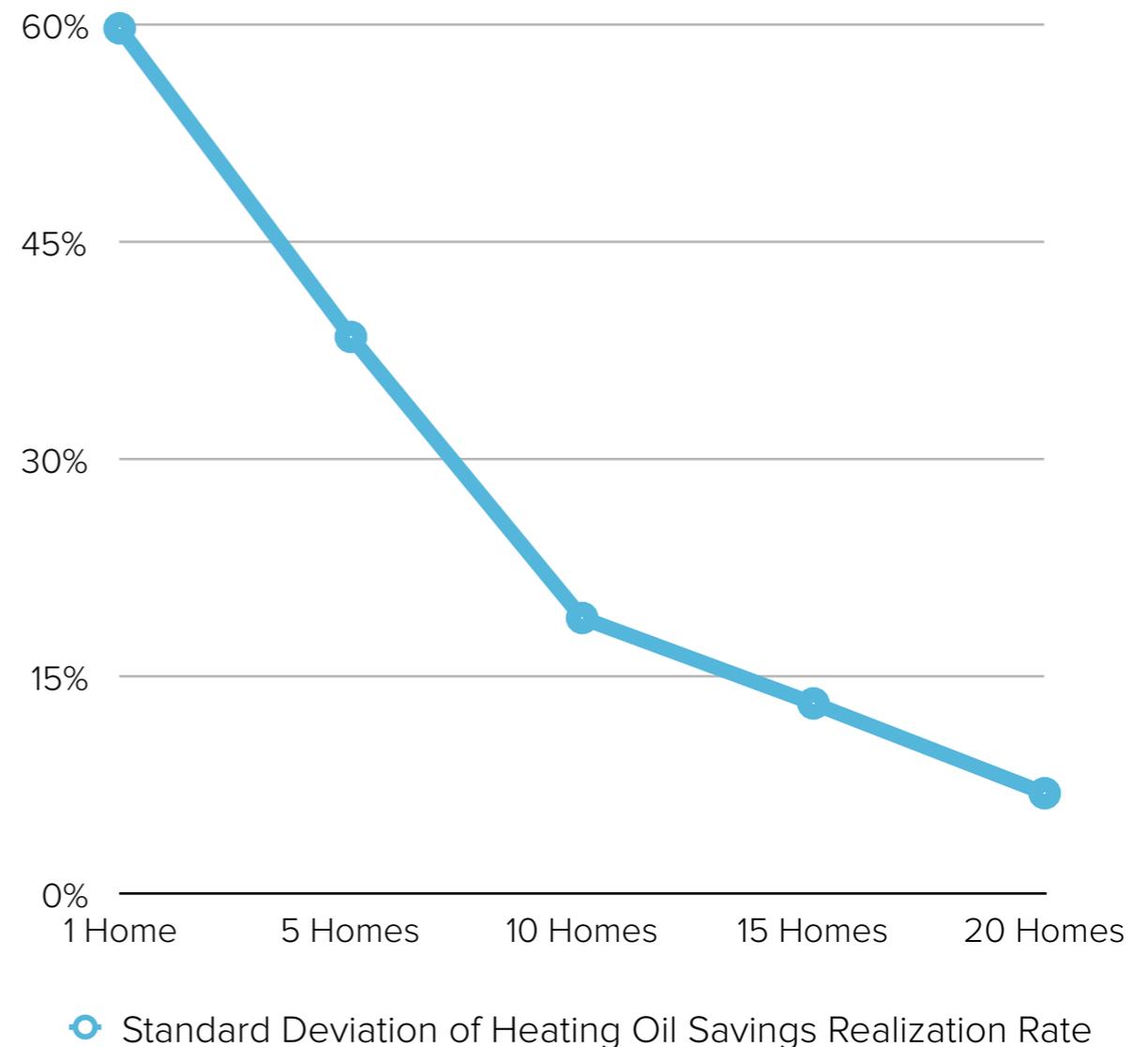
Non-significant tradeoffs between accuracy, transparency, and access: for private sector actors, accuracy is a non-negotiable

- Accuracy driven by quality and quantity of data as well as complexity of predictive analytics

- Many customers will not be eligible if not sufficient combination of data and analytics complexity / sophistication

- Best practice predictive analytics methods like random forest not conducive to transparency

- Methods also differ based on customer type, upgrade type, and data availability

- Consistency can be defined in method (e.g. how to deal with outliers) or result (e.g. predictive accuracy of 95%+)

40%

Percentage of homes currently qualified for HomeAdvance[1]

1. Sealed data
2. OpenEE analysis of Sealed data

SEALED

Live in the comfort you deserve.

Lauren Salz
Co-Founder and COO
lauren.salz@sealed.com