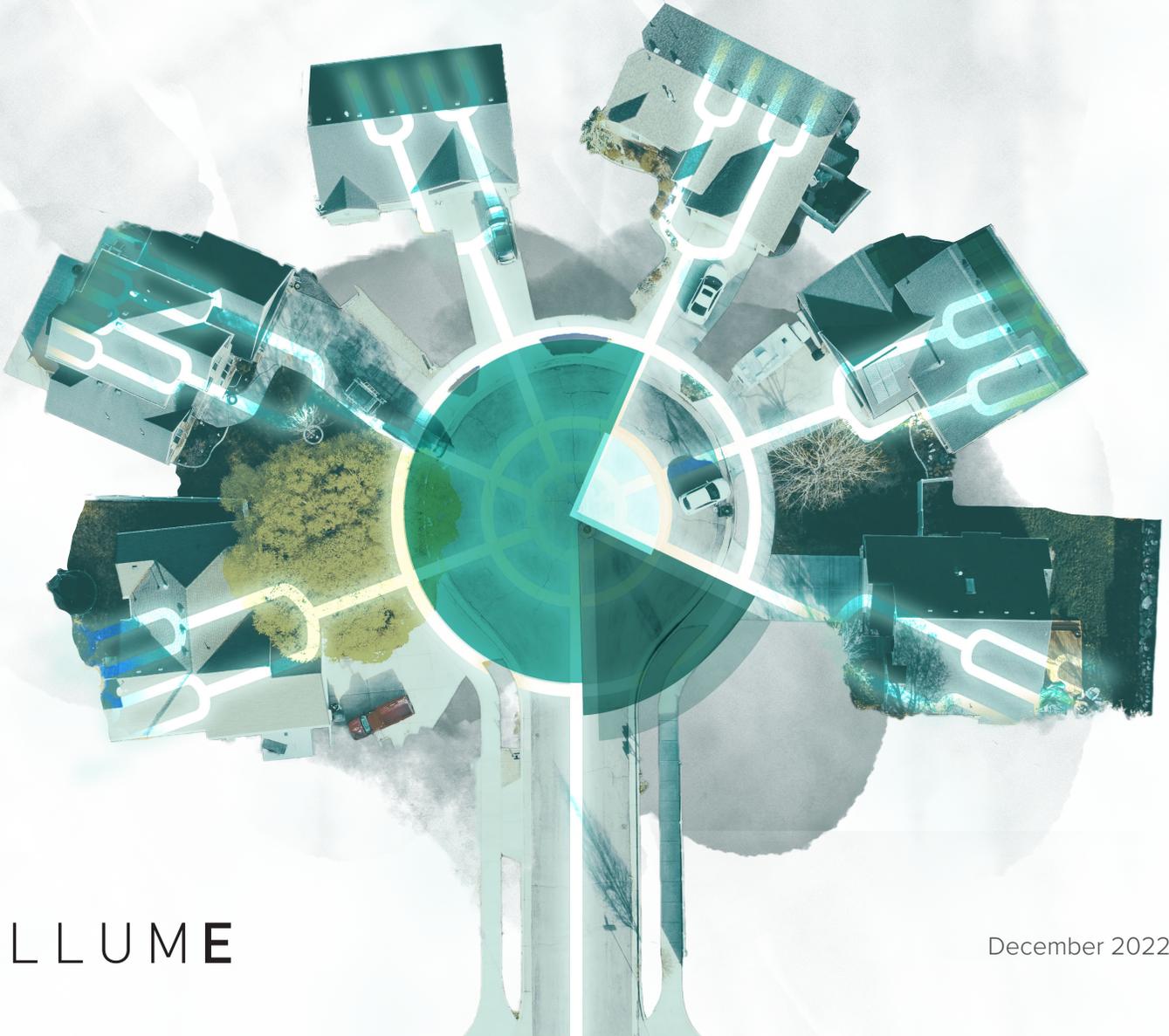


Testing the Efficacy of Home Energy Reports:

A Meta-Analysis of HER Program Evaluations

Drawing on statistical methods from biomedical research, ILLUME applied meta-analysis techniques to measure savings from home energy report (HER) programs to understand if HERs continue to be an effective source of energy savings for residential utility customers.



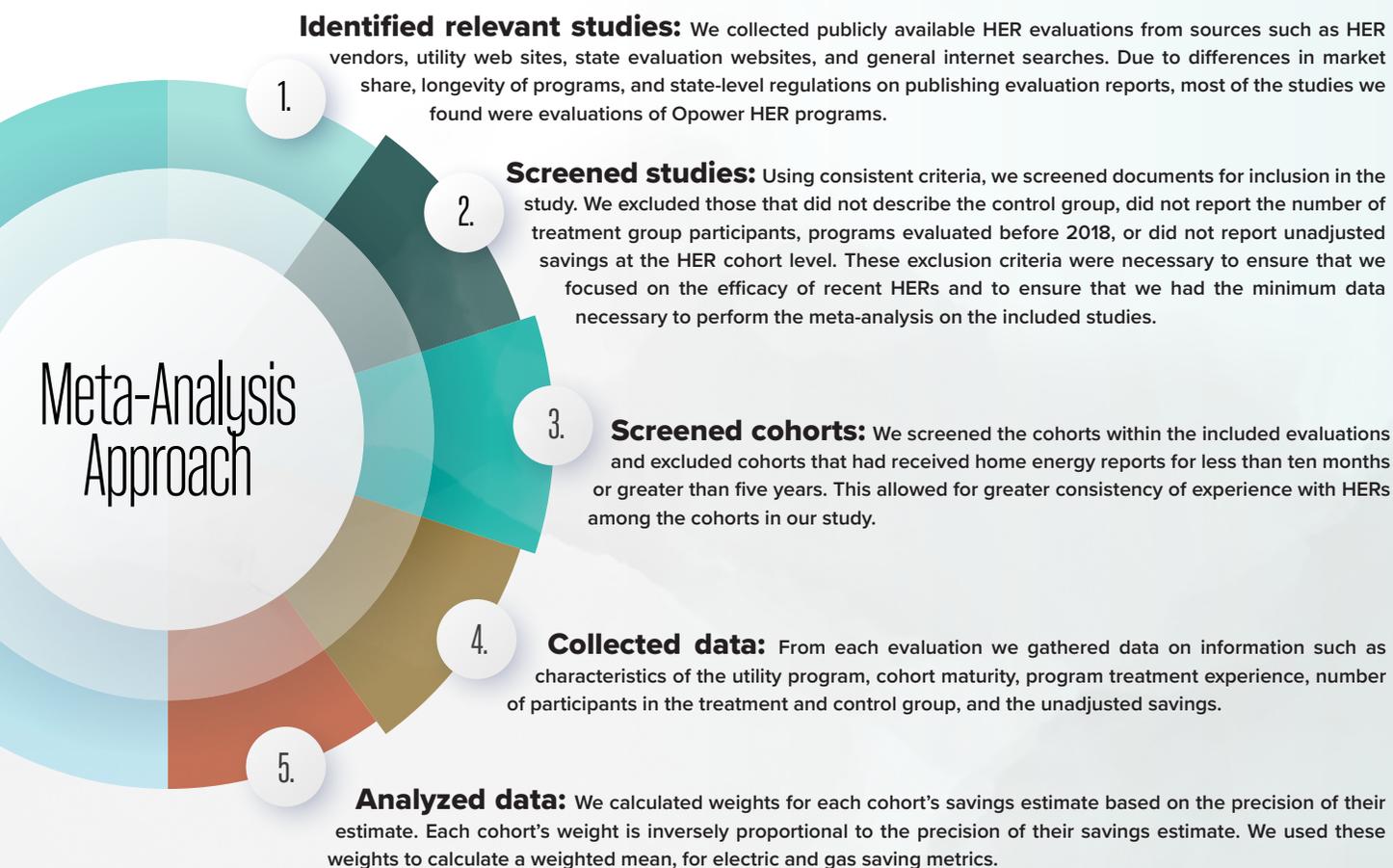
The Challenge

Home energy reports (HERs) are a key part of utility behavioral energy efficiency programs, but many program administrators and industry experts are asking: *are HERs still effective at getting the attention of customers and influencing them to save energy?*

Further, are there different levels of efficacy of HERs across factors such as fuel type, vendor, cohort maturity, and distribution mode?^{1,2} Oracle Energy and Water, was interested in taking a systematic look at recent HER evaluations to find out.

The Approach

A meta-analysis systematically and statistically combines results from multiple studies to generate a weighted average for a particular metric. This provides an estimate of the metric across multiple studies and accounts for differences in sample size, study approach, treatment effect size, and sensitivity to inclusion in the study. This is a useful approach to assess multiple home energy report evaluations because it provides a systematic and statistically precise methodology to determine the energy savings that home energy reports generate across evaluations and how various factors impact energy savings. To complete this meta-analysis, ILLUME:



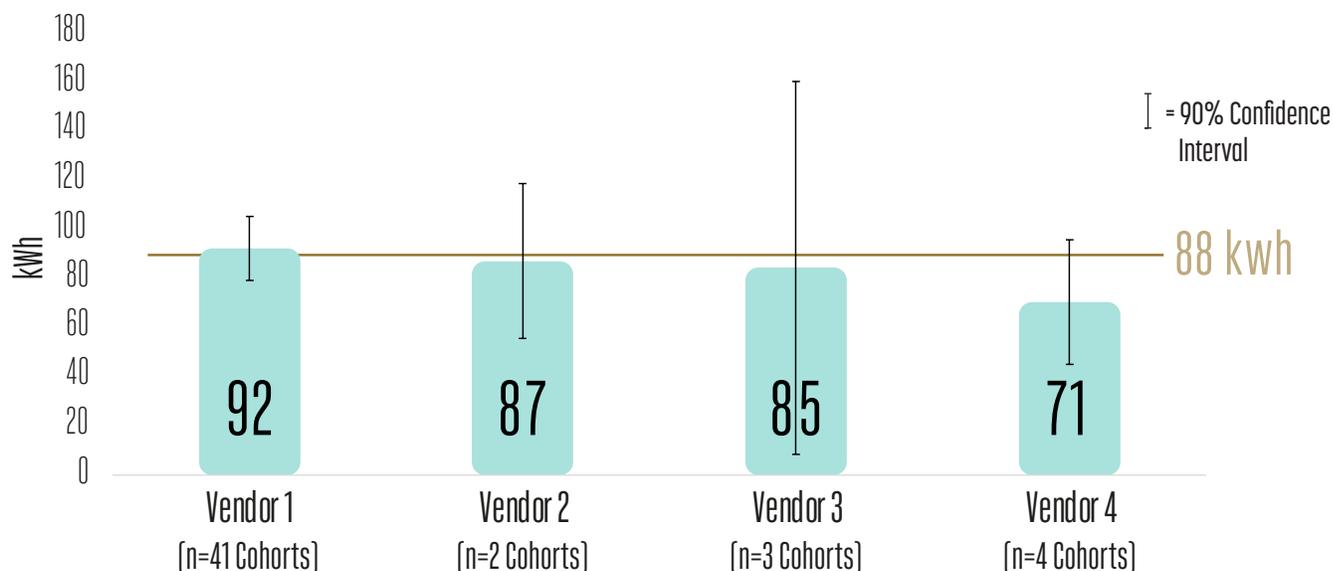
¹ A cohort is a group of customers who receive home energy reports starting at the same time.

² Cohort maturity refers to how long the group of customers have been receiving the home energy reports (e.g., 1 year).

The Results

HERs are Still Effective at Influencing Customer Behavior to Save Energy

For electric customers, HERs save 88 kWh on average annually per household and 1.16% percent of average household electricity usage. For gas customers, HERs save on average 4.4 Therms annually per household and 0.87% percent of average household gas usage. We found variation in the average savings across vendors, but the differences are not statistically significant. The figure below shows the variation in electric savings by vendor with the horizontal line showing the average 88 kWh savings across all vendors and cohorts.



As Cohort Maturity Increases, So Does Electric Savings

As customers receive home energy reports for more years, their average annual electric savings increases. We found a correlation (Pearson's r) of 0.48 between years of receiving reports and electric savings. We found a positive, but weaker relationship (Pearson's $r=0.19$) between years of receiving reports and gas savings.³

Percent Savings Goal Achieved Varies Across HER Vendors

We found differences across vendors in the percentage of savings goal that the program achieved, with some vendors saving as little as 32% of the program goal and others saving as much as 120% of the program goal for electric savings.⁴ Similarly, there is variation in savings goal achieved across vendors for gas savings. However, due to differences in how goals are set, limitations caused by small number of cohorts for some vendors, and the lack of precision estimates reported for this metric, these findings should be interpreted carefully. We should move cautiously into digital-only approaches.

Most of the cohorts we were able to include in our analysis received both paper and email reports with a smaller number receiving only paper or only email. We compared savings by report type and found lower savings for email-only programs (54 kWh) compared to paper only (118 kWh) and paper and email (107 kWh). The differences between the two groups that received paper are not statistically significant. We found a similar pattern for gas programs. We caution that the comparison is based on a small number of cohorts in the email-only group and urge the industry to do more research on impacts by report type.

³ https://en.wikipedia.org/wiki/Pearson_correlation_coefficient

⁴ For this analysis, we relaxed most exclusion criteria, keeping all studies except for evaluations prior to 2018. We were not able to calculate confidence intervals because precision estimates were not given for these values. This means that these findings suggest differences, but are not conclusive.

Inconsistencies in HER Evaluations Hinders Analysis

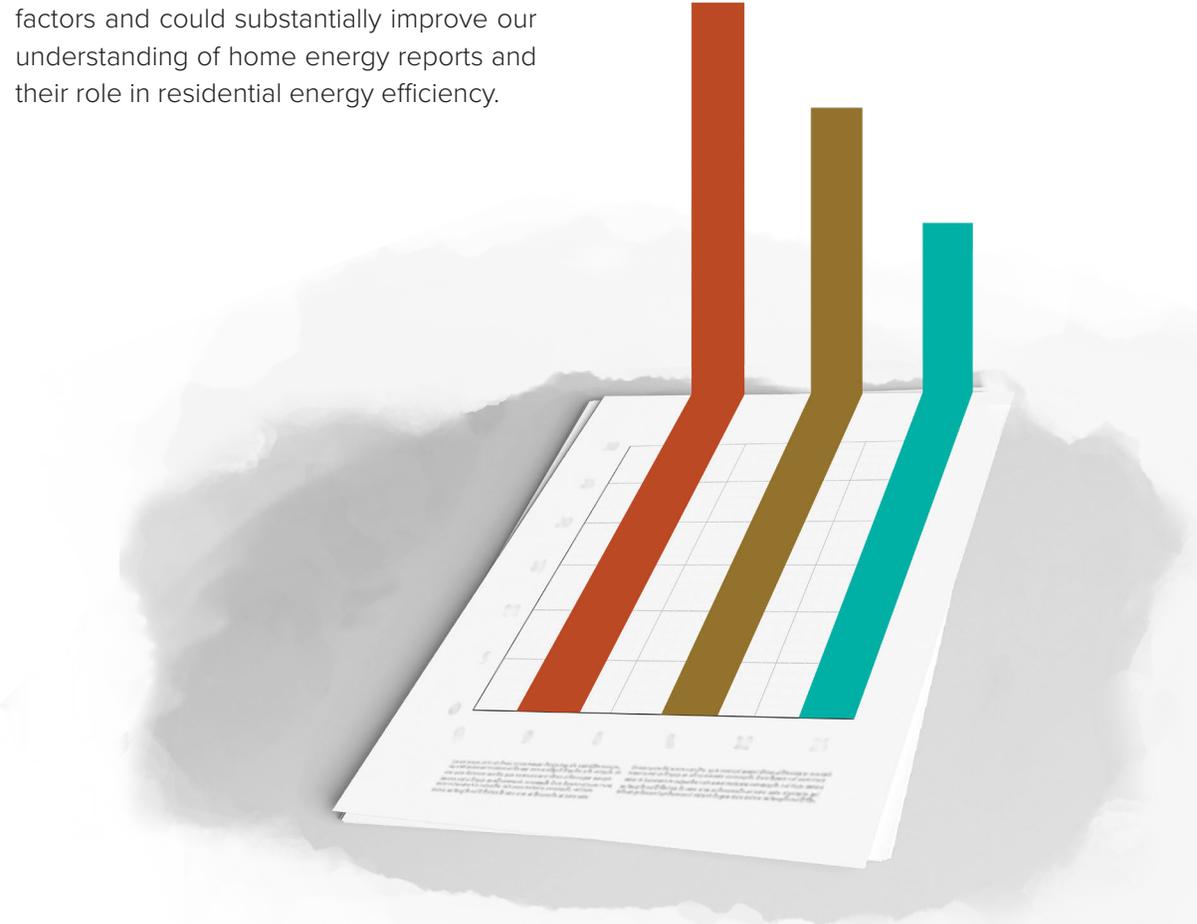
There is wide variation in the way evaluations report savings for home energy reports. There is considerable variation in naming conventions for different types of savings, which types of savings are reported, and how they are reported (such as level of granularity and whether a precision estimate is included). These inconsistencies limited the data we could use to a subset of available reports and cohorts.

The Takeaway

Overall, we found that home energy reports continue to save energy in recent years. They are still a helpful and effective tool to influence customer behavior and the longer a customer receives them, the more energy they are likely to save.

A primary finding from this study is the inconsistency in reporting conventions across home energy report evaluations. More consistency across evaluation reports would enable deeper analyses across more factors and could substantially improve our understanding of home energy reports and their role in residential energy efficiency.

Oracle is a computer technology corporation best known for its software products and services. In 2016, Oracle acquired Opower, a software-as-a-service company that provides customer engagement, energy efficiency, affordability, demand flexibility, and digital self-service solutions to utilities.



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