JACKSON ASSOCIATES WHITE PAPER

Avoiding Scope 3 Financed Emissions Data Development Pitfalls

June 7, 2022

Jerry Jackson, Ph.D.
Jackson Associates
37 N. Orange Avenue, Suite 500
Orlando, FL 32801

407-926-4048
979-204-7821 (cell)
www.maisy.com
jjackson@maisy.com

Contents

About the Author

Jerry Jackson, President of Jackson Associates (JA), is the author of MAISY ZIP Level Scope 3 Emissions Databases, developed from MAISY ZIP Level Utility Customer Energy Use Databases. MAISY Databases were first introduced in 1995. Annual updates have expanded databases to include data from more than 7 million US utility customer records. MAISY data have been used by the US Department of Energy in analysis supporting appliance efficiency standards, by state regulatory agencies from Texas to New York, and by dozens of solar, CHP, battery and other energy equipment manufacturers, utilities and retail electricity providers.

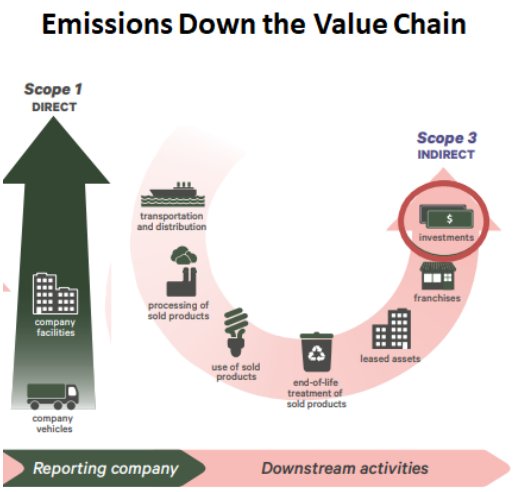
He has provided testimony in a variety of state and provincial hearings as an expert witness. His early modeling work at Oak Ridge National Laboratory provides the basis for energy forecasting at the US Department of Energy and state agencies, most recently with a 2021 agent-based model forecasting application for five Indiana investor owned utilities submitted to the Indiana Public Service Commission by the Perdue University State Utility Forecasting Group.

He published "Energy Budgets at Risk (EBAR): Risk Management Approach to Energy Purchase and Efficiency (Wiley, April, 2008)," the first extension risk management principles to evaluate building energy efficiency investments.

He received a patent in 1995 for a drill-down and data visualization technology that has been licensed by Microsoft, Oracle, SAP and every other major business intelligence software provider.

He holds a Ph.D. in economics from the University of Florida with specialties in econometrics and regional economics. His previous positions include signature professor at Texas A&M University, Chief, Applied Research Divisions at Georgia Tech Research Institute and economist at Oak Ridge National Laboratory and the Federal Reserve Bank of Chicago. A partial list of clients is available at http://www.maisy.com/clients.htm

Introduction



Source: PCAF (2020). The Global GHG Accounting and Reporting Standard for the Financial Industry. First edition.

A proposed SEC rule will soon require mid-to-large publicly-traded financial institutions to calculate and report emissions of their residential mortgagors and commercial real estate (CRE) loan customers (so-called downstream or Scope 3 emissions). These proposed rules create a huge new reporting requirement and a challenging data development effort for financial firms.

This white paper provides context to data and reporting requirements in the proposed rule, describes data issues and demonstrates the benefits of basing emissions estimates on ZIP level energy use data.

Residential Scope 3 emissions are the focus here; a forthcoming companion paper will address CRE issues.

In its 406 page proposed rule, the SEC identifies the Partnership for Carbon Accounting Financials' Global GHG Accounting & Reporting Standard (the "PCAF Standard") as a an acceptable reporting standard. More than 30 US financial institutions have already committed to applying this standard. The standard methodology, in the most basic form, calculates emissions as follows:

Emissions = average dwelling unit energy use * # mortgages * emission factor * attribution factor eq(1)

Emissions Intensity = emissions /activity level eq(2)

Attribution factor is the ratio of outstanding loan amounts to the property values at loan origination. Emission factors are available from the EPA while number of mortgages and the attribution factor are available from the financial institution's records.

The data development challenge is:

- how best to develop average dwelling unit energy use estimates,
- what to use as an activity level, and
- what geographic and customer level detail to employ.

The next section provides context to these data issues provided by the proposed rule. Additional sections address issues associated with geographic detail, estimation of average dwelling unit energy use, and issues associated with emissions intensity calculations.

The paper illustrates the dangers of using inappropriate data to fulfill these new reporting tasks. More specifically, examples show how using aggregate geographic and customer population energy use data (e.g., national, regional or state averages) biases estimates and can easily either overstate or understate emissions and changes in emissions intensity estimates over time.

Since emissions intensity is promoted as a metric to determine increasing or decreasing emissions efficiency and risks over time, these errors carry the potential for reputational risk as increasing focus is placed on individual company calculations of these reporting requirements. A new price-index based methodology drawn from economic theory is

recommended to adjusts for changes in customer geographic and household characteristics over time to minimize biases in reported emissions statistics. This methodology is used by the US Department of Commerce in price index calculations and is a well-accepted approach to account for the kind of computational complexity inherent in the emissions index.

Data and Methodology Expectations

The SEC's stated objective is to provide "information to investors to enable them to make informed judgments about the impact of climate-related risks on current and potential investments. " Disclosures "would also enable an investor to assess the efficiency and efficacy of the registrant's actions to achieve its target or goal."

The proposed rule will require firms to provide the breakdown of the different GHG (greenhouse gas) emissions and a description of "the methodology, significant inputs, and significant assumptions used to calculate its GHG emissions metrics." PCAF methodology states that "financial institutions shall use the highest quality data available for each asset class and improve the quality of the data over time."

Proposed rule provisions state that any change in methodology used to calculate emissions or emissions intensity should be described to allow investors to judge how such changes might have affected year to year comparisons. The rule also requires data gaps to be identified and how "accounting for any data gaps has affected the accuracy or completeness of its GHG emissions disclosure. This information should help investors understand certain underlying uncertainties and limitations, and evaluate the corresponding reliability, of a registrant's GHG emissions disclosure."

A particularly thorny issue for financial firms, addressed in a following section, relates to the proposed GHG intensity disclosure which, according to the SEC "would provide a standardized method for presenting such measure of efficiency across registrants, which should facilitate comparability of the registrant's emissions efficiency over time."

In summary, the SEC expects Scope 3 emissions filings that

- Use the highest quality data available
- Describe how data gaps impact reported emissions
- Describe how changes in data or methodology impact year to year emissions comparisons
- Provide an emissions intensity statistic that supports year to year emissions efficiency comparisons

Meeting these expectations in the most cost-effective manner requires a data development strategy that recognizes availability of existing data both inside the financial institution and from other sources and begins with a methodology that is as accurate as possible, will require minimum revisions over time and will be scalable as more information becomes available.

The next sections consider selection of an appropriate data specification for equation (1) that meets these constraints.

Geographic Segmentation

More geographic detail is always preferred when developing values for the four right-hand terms in equation (1).

Dwelling unit energy use varies by location as a result of variations in climate, dwelling unit floor space, appliance fuel choices, income and other items. Year to year changes in the geographic distribution of the mortgage customer base will generate changes in emissions that do not necessarily reflect changes in emissions efficiency.

Consider a national firm whose mortgage customer base declines in California and increases in Florida from one year to the next. Total emissions and emissions intensity will increase because the emission factor for electricity use per kilowatt hour in Florida is 0.911 pounds versus 0.480 in California.

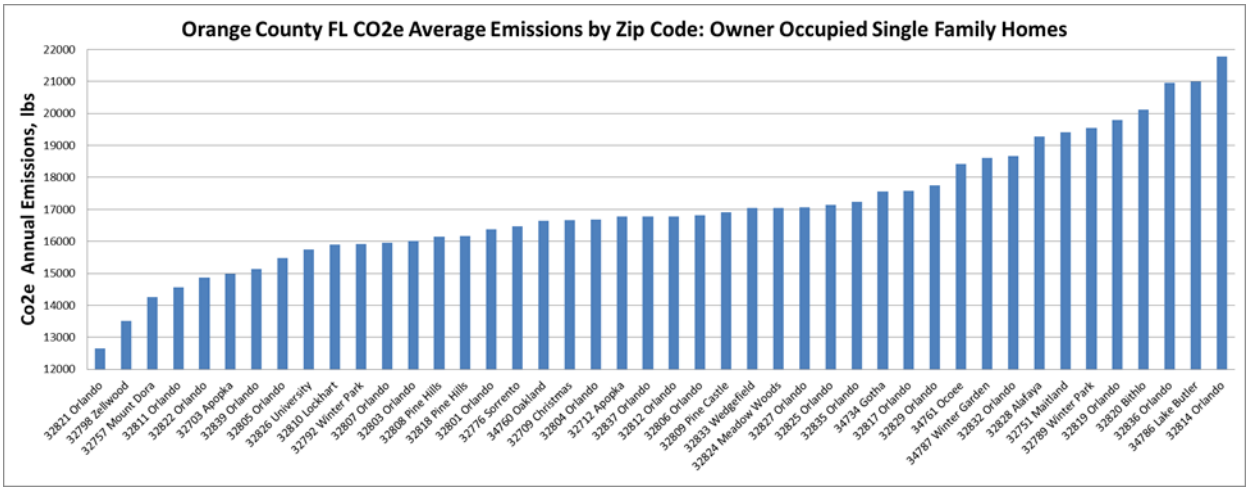
Differences in appliance fuel choices for space heating, water heating and clothes drying, use of solar PV, dwelling unit and homeowner characteristics can also create significant emissions differences across geographic areas.

The objective of the SEC rule is certainly not to disadvantage companies who are simply responding to demographic market changes. Emissions and emissions intensity disclosures reported for geographic segments will better meet the emissions information disclosures and comparisons desired by the rule.

Since financial firms can easily provide ZIP codes of mortgagors along with their outstanding balance/origination property value and since the EPA provides emission factors for individual ZIP codes, the preferred geographic methodology specification is a ZIP code area.

Information is not directly available on individual mortgagor energy use; hence the use of "average dwelling unit energy use " in equation 1 above. However, average energy and resulting emissions estimates can vary significantly across geographic areas and even ZIP codes within the same geographic area. For example CO2e emissions data on ZIP codes in Orange County, Florida (population ~ 1.2 million) shown below reveals a range of 12,000 to 22,000 pounds of CO2 average dwelling unit emissions. Average ZIP level energy use variations reflect variations in average dwelling unit size, average household size, average income and other factors.

This ZIP code variation clearly show that ZIP level-detail should be incorporated in any emissions calculation. Changes in the ZIP distribution of the customer population will impact both total emissions and emission intensity estimates. Conclusion: more geographic detail is always preferred to less when developing values for the four right-hand terms in equation (1).

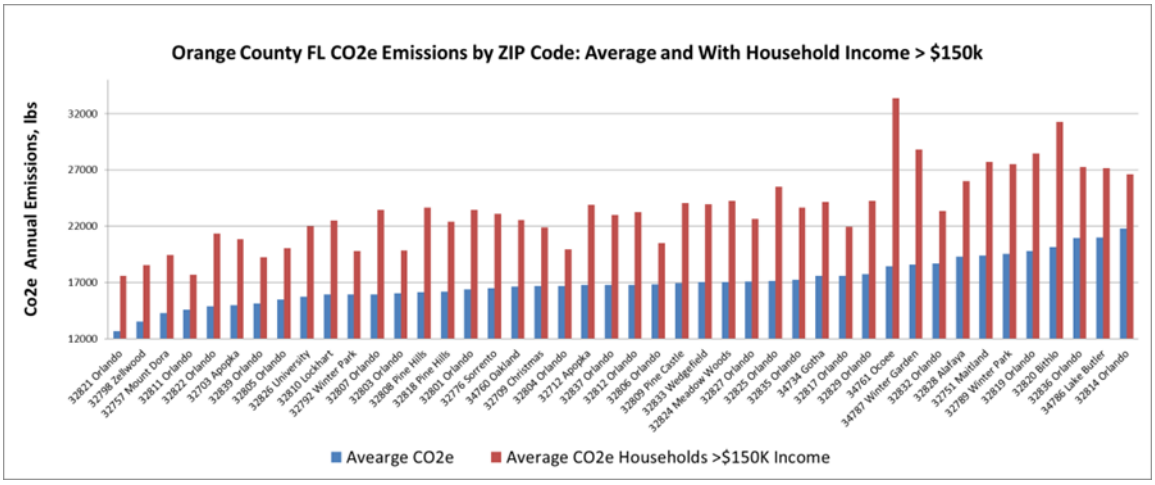


Source: MAISY Scope 3 Mortgage Emissions Database

Customer Segmentation

Variations in dwelling unit and customer characteristics across ZIP codes over time can create the same kind of estimation bias illustrated in the California – Florida comparison above. Identifying customer emissions separately for general income and or floor space segments within ZIP codes can improve estimates of average energy use and emissions and provide context to changes in emissions and emissions intensity over time.

Variations in average mortgagor emissions across ZIP codes based on household income can be significant as illustrated in the chart below for Orange County Florida across ZIP codes and income categories.



Source: MAISY Scope 3 Mortgage Emissions Database

Average Mortgagor Energy Use

Existing publicly available resources appropriate for representing mortgagor energy use is available only at the regional or in a few cases the state level. Applying regional or state average energy use diminishes the accuracy of both emissions and emissions intensity estimates as indicated by the variations across ZIP codes and customer segments data in the previous sections.

ZIP level dwelling unit energy use data in Jackson Associates's MAISY ZIP Level Residential Databases are applied to estimate MAISY Scope 3 Mortgage Emissions for financial institution ZIP level mortgagor information.

Reputational Risk of Aggregate Emissions Intensity Statistics

The greatest reputational risk of inaccurate emissions disclosures is associated with the emissions intensity which is designed to "provide a standardized method for presenting such measure of efficiency across registrants, that should facilitate comparability of the registrant's emissions efficiency over time."

As the California – Florida shift in mortgages example above illustrates, an annual decrease in the emissions intensity may not reflect an improvement in emissions efficiency and an increase may not reflect deterioration in emissions efficiency.

Ignoring the change in customer distributions in this example generates and "apples to oranges" comparison because year t emissions consisted of a greater fraction of California mortgages than in year t+1. Other variations across even small markets such as availability of natural gas, income, floor space and so on confound this year to year comparison even further.

The solution to providing emissions intensities that provide comparable statistics from year to year is to apply economic price index methodologies such as those used in the US consumer price index. When applied to emissions intensity calculations, these methodologies weight individual segment emissions in each year to account for differences in customer population distributions providing a mortgagor intensity estimate that filters out year to year differences in market and customer segment impacts. That is, that provides an apples to apples comparison.

A detailed description of emissions intensity calculations and economic price index theory is the topic for a future white paper. However, the important take-away here is that an index-based calculation of emissions intensity will reduce estimation biases providing a more accurate measure of year to year progress on emissions efficiency.

Summary

The objective of this white paper is to underscore the importance of developing a Scope 3 financed emissions data development strategy that

- meets the intent of the new SEC emissions disclosure rule,
- applies the most accurate methodology in measuring year to year measures of emissions and emissions intensity,
- uses the best currently available data, and
- provides scalability with respect to incorporating additional data as it becomes available.

As indicated in the examples above, broad geographically-based emissions measures will fail to accurately account for impacts of changes in the mortgage customer base from year to year potentially overstating or understating improvement in Scope 3 emissions levels, especially with respect to the emissions intensity statistic.

Availability of EPA emissions factors, mortgages and attribution factor data by ZIP code make a ZIP-based methodology the best choice. Applying ZIP level information for mortgagor income and floor space segments will improve accuracy and should be part of each financial firm's data development strategy even if these data require more effort to extract from legacy database systems.

Financial institutions face a difficult challenge and reputational risk in quantifying emissions intensity used to judge success in annual improvements in Scope 3 emissions intensity. Changes in non-energy-efficiency related customer population characteristics will distort this statistic unless explicitly taken into account. This paper introduces the application of an emissions intensity index based on economic price index theory to account for these biases to provide a more accurate measure of financed emissions intensity.