Janelle A. Beverly. A Comparison of Four Energy Data Collection Methods in Durham City/County, North Carolina. A Master's Paper for the M.S. in I.S degree. April, 2012. 32 pages. Advisor: Dr. Christopher Lee.

The Department of Energy (DOE) has spent $11.3 billion in Recovery Act funds. These funds support state and local energy programs to provide energy efficiency. The DOE evaluates the impacts of these investments with various reporting metrics, including energy savings. Energy Efficiency Program managers in North Carolina have reported challenges in collecting energy information from public utilities and homeowners. This study examined four energy data collection methods that Durham City/County Sustainability Office employs with 435 homes: email solicitation, mail solicitation, direct access to a utility database and utility report. This research included a telephone survey of 30 Better Buildings Program managers. Fifty-three percent of surveyed managers collect energy information from public utilities. This study found that, of the four energy data collection methods, utility reports yielded the most complete and timely access to home energy information. Managers have limited access to energy information dependent on the energy data collection method.

Headings:

Information Access

Data Acquisition

Program Evaluation

Energy Conservation and Efficiency

A COMPARISON OF FOUR ENERGY DATA COLLECTION METHODS IN DURHAM CITY/COUNTY, NORTH CAROLINA

by
Janelle A. Beverly

A Master's paper submitted to the faculty
of the School of Information and Library Science
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Approved by

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Christopher A. Lee

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GLOSSARY OF TERMS

Energy Efficiency (EE) managers – individuals who manage non-profit and state residential energy efficiency programs; also referred to as Sustainability Officers

Home energy retrofit – the improving of existing buildings with energy efficiency equipment

Pre- and post-retrofit energy information – energy information (energy cost and use data and/or behavior-based energy efficiency data) collected for households that received professional home energy retrofits

Energy conservation – the absolute reduction in energy demand compared to a certain baseline, measured in energy units

Energy efficiency – the improvement (increase) in the efficiency with which energy is used to provide a certain product or service, measured in units of output per energy unit

BACKGROUND

The U.S. Department of Energy (DOE) received nearly $42 billion from the American Recovery and Reinvestment Act of 2009 (AARA), earmarked for a variety of ongoing or new projects. Three major energy efficiency programs were allocated $11.3 billion to support state and local energy programs: the Weatherization Assistance Program (WAP), the State Energy Program (SEP) and the Energy Efficiency and Conservation Block Grant Program (EECBG) (Recovery Board, 2012). The American Council for an Energy-Efficient Economy (ACEEE) (2011) has recently reported a growth of non-profit and state residential energy retrofit programs. These programs provide homeowners with energy efficiency upgrades designed to lower their utility bills and energy use. The ACEEE (2011) states, "The industry is growing rapidly. In pursuit of higher savings goals, electricity and natural gas programs are expanding their efforts and seeking new sources of savings, including behavioral change. States that did not previously engage in efficiency programs are now taking advantage of this opportunity." It is unclear if the recent growth of energy efficiency programs will continue after AARA funds expire on September 30, 2015.

To measure and evaluate the effectiveness of home energy retrofits, the International Performance Measurement and Verification Protocol (IPMVP), prepared by the DOE, recommends energy demand savings be determined by comparing measured energy use before and after the implementation of an energy savings program (2002).

Energy Savings = Baseyear Energy Use – Post-Retrofit Energy Use ± Adjustments

Furthermore, the DOE (2010) requires reporting metrics for projects supported by WAP, SEP and/or EECBG funds focus on job creation and retention (including number, type and duration), energy use and demand savings, renewable energy capacity generation and carbon emissions reduction. In order to satisfy federal reporting requirements, managers of residential energy efficiency (EE) programs must have access to pre- and post-retrofit energy information that is accurate, timely and reliable; however many EE managers report challenges to collecting this energy information from public utilities and homeowners. For instance, Town of Chapel Hill Sustainability Officer, John Richardson,[1] describes the process to obtain consent to access pre- and post-retrofit energy information from public utilities as labor-intensive. Richardson states, "Utility data can be obtained from most utilities on an annual basis with the permission of the homeowner. It is a labor-intensive process to have homeowners sign forms releasing their utility data and then go and retrieve data on an annual basis for up to a 24-month period following the retrofit." Similarly, once home energy retrofits have been installed, homeowners have little incentive to track and report utility information to EE managers. Monthly or quarterly reporting may seem laborious to homeowners. They may report energy information sporadically or not at all.

Information access is a critical component to any program evaluation plan. Without access to accurate, timely and reliable pre- and post-retrofit energy information, EE managers are unable to evaluate their programs and satisfy grantors' reporting requirements. There are multiple methods to collect pre-and post-retrofit energy

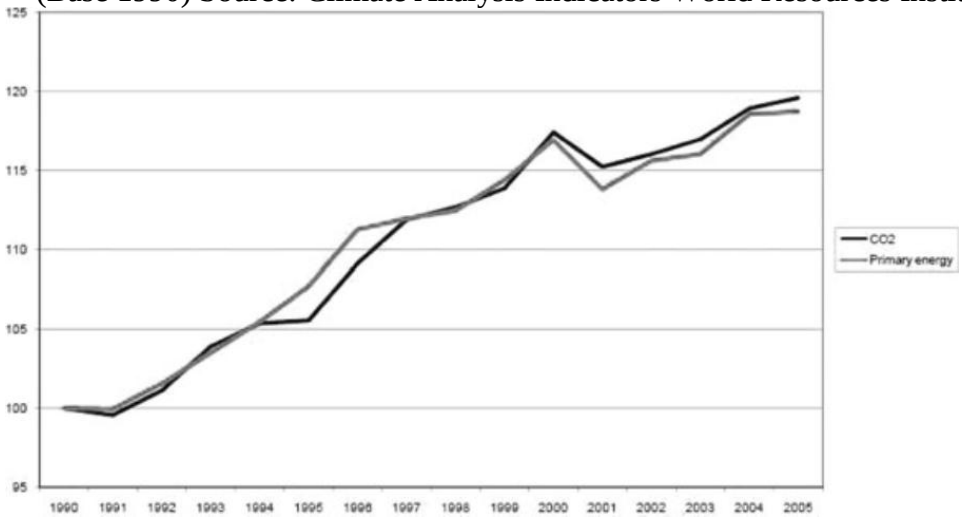
[1] Email correspondence on 09/02/2011 with Jeff Hughes, Executive Director at UNC Environmental Finance Center

information. However, EE managers must decide which data collection method best meets their needs and circumstances.

LITERATURE

Energy conservation and efficiency is a major option for the energy sector to address environmental and economic challenges (Linares and Labandeira, 2010). Programs that improve home energy efficiency and conservation help to reduce carbon dioxide emissions, preserve natural resources and promote economic prosperity. Analysts argue that increased energy conservation can save large amounts of energy by reducing energy demand and thus carbon dioxide emissions from the burning of fossil fuels (Keepin and Kats, 1988; Kats, 1990; Geller, 1991; Goldemberg, 1991). For instance, researchers in the People's Republic of China (China) studied energy intensity [demand] changes in the material production sector, which accounts for 80% of total commercial energy consumption in China. Between 1980 and 1988, energy intensity [demand] was reduced by 37%. Analysis indicates improvements in energy efficiency, rather than structural changes, are the dominant reason for the reduction in energy

Figure 1 Primary Energy Demand and Carbon Dioxide Emissions in USA, 1990-2007 (Base 1990) Source: Climate Analysis Indicators World Resources Institute, Washington, DC.



intensity (demand) (Polenske and Lin, 1993). Schipper *et al*. (1997) discuss a statistical and casual relationship exists between energy demand and carbon emissions. Greater reductions in energy demand yields decreases in carbon emissions. Figure 3.1 depicts this relationship with energy demand and carbon dioxide emissions in the USA from 1990 to 2007.

Energy conservation also helps to preserve valuable natural resources such as coal, oil and natural gas, which can promote economic prosperity (ACEEE, 2011). For instance, in order to analyze the effects of energy efficiency and renewable resource use, the ACEEE and the Energy and Environmental Analysis Inc. (EEA) conducted a study of 48 states to analyze natural gas markets in terms of price, consumption and expenditure effects of aggressive, but readily achievable, efficiency programs and renewable energy resources use. This 2003 study shows that energy efficiency and renewable energy could cost-effectively reduce natural gas prices and volatility, while significantly lowering consumer natural gas expenditures. By modestly reducing both natural gas and electricity consumption, and increasing the installation of renewable energy generation, consumers can dramatically affect natural gas prices and availability (ACEEE, 2003). In 12 months, nationwide efforts to expand energy efficiency and renewable energy could reduce wholesale natural gas prices by 20 percent and save consumers $15 billion per year in retail gas and electric power costs (Elliot and Shipley, 2004). This reduction would result from the combined impacts of reduced natural gas prices, and reductions in natural gas consumption due to decreased consumer demand and expanded renewable electric power generation (ACEEE, 2003).

States are continuing to use energy efficiency as a key strategy to generate cost-savings, promote technological innovation and stimulate growth. For instance, state budgets for electricity efficiency programs have increased to $4.5 billion in 2010 from $3.4 billion in 2009 (ACEEE, 2011). State energy efficiency programs attempt to reduce homes' energy use through targeted home improvements such as sealing and insulating air leaks and replacing old windows with Energy Star qualified windows. These programs also teach homeowners to conserve energy with such tips as to was only full loads of dishes and clothes or turn off lights and electronics when no longer in use (DOE, 2012). A research study (2011) conducted by the ACEEE details how state economies enjoy ripple effects of energy efficiency efforts; as consumers and businesses save on energy costs, they can spend elsewhere in local economies on goods and services that produce more widespread benefits than spending on energy bills.

However, in order to evaluate home energy efficiency programs and measure energy cost savings, the Department of Energy recommends in the International Performance Measurement and Verification Protocol (IPMVP), energy demand savings be determined by comparing measured energy use before and after the implementation of an energy savings program (2002).

Energy Savings = Baseyear Energy Use – Post-Retrofit Energy Use ± Adjustments

Furthermore, the DOE (2010) requires reporting metrics for projects supported by WAP, SEP and/or EECBG funds focus on job creation and retention (including number, type and duration), energy use and demand savings, renewable energy capacity generation and carbon emissions. In order to satisfy federal reporting requirements, managers of residential energy efficiency (EE) programs must have access to pre- and post-retrofit energy information that is accurate, timely and reliable.

Nonetheless, ACEEE Researchers (2010) posit helping utility customers save energy through improved energy efficiency can work against the utility's financial interest. The 2010 report details the Lost Revenue Adjustment Mechanism (LRAM), a rate adjustment mechanism that allows the utility to recover revenues that are "lost" due to energy savings from approved efficiency programs. Results show LRAM does not completely remove the disincentive to implement energy efficiency because to demonstrate loss in revenues, a utility must quantify energy saved by its efficiency programs, which is difficult or impossible to measure (ACEEE, 2010).

RESEARCH QUESTIONS

[Q1] What methods are EE managers using to collect pre- and post-retrofit energy information?

[Q2] Do four selected energy data collection methods differ in terms of completeness, privacy, response and turnaround rate?

STUDY SETTING

Durham City/County Sustainability Office, an intergovernmental initiative to provide 690 Durham households with targeted home energy improvements, received $2,173,600 as part of the EECBG program and an additional $500,000 in non-stimulus

funding from the US EPA's Climate Showcase Communities Grant Program. A portion of these funds is being used to implement two new programs, Home Energy Savings Program (HESP) and the Neighborhood Energy Retrofit Program (NERP), designed to help households reduce energy use by 20 percent. To date, professional contractors have completed 119 HESP and 381 NERP home energy retrofits (Durham City/County Sustainability Office, 2012).

Durham City/County must submit quarterly reports, which detail estimate aggregate energy savings because of home energy retrofits. In order to calculate these energy savings, Durham City/County must collect pre- and post-retrofit energy information for each household that received a professional home energy retrofit. Prior to this study, the Office had not begun to collect this energy information. The Office sought the assistance of the UNC Environmental Finance Center to identify effective energy data collection methods. The goal of this research is to provide Durham City/County and other EE managers with more information and insight to help guide their energy data collection.

METHODOLOGY

This project sought to evaluate energy data collection methods by studying four different approaches that Durham City/County Sustainability Office has employed to collect pre- and post-retrofit energy information for 435 households that received professional energy retrofit upgrades.

Durham used the following data collection methods to gather monthly energy data for households that received home energy retrofits:

1. **Email Solicitation**: Email requests, shown in Appendix C, were sent to participants to download and forward their online billing statements to EE managers.
2. **Mail Solicitation**: Mail requests, shown in Appendix D, were sent to participants to copy billing statements and mail them to EE managers.
3. **Direct Access to Utility Database**: Utility granted Durham third-party access to its database of utility records.
4. **Utility Report**: Utility provided Durham with periodic batch reports of utility records.

This research included a quantitative analysis of four evaluative criteria for each data collection method. Four samples of 38 households were randomly selected from the groups of households targeted with each of the different energy data collection method. Durham provided 15 data fields, shown in Appendix B, for each household in the sample groups, including records on which households were targeted for each method. Each sample group was monitored for 30 days and evaluated in terms of the following criteria.

- **Completeness of Information Received** was the percentage of households in each of the sample groups for whom monthly energy data for one-year prior and each subsequent month following the energy retrofit was present. This percentage was calculated by reviewing the energy data date ranges for each household in the sample group in comparison to the date their professional retrofit was installed. For instance, the household that received a retrofit on 10/25/2011 and submitted energy data for the months 12/09/2009 to 01/17/2012 was marked completed,

because energy data for one-year prior and each subsequent month following the energy retrofit was present.

- **Privacy** was evaluated by totaling the incidences of eight personal identifiers (name, address, phone, fax, email, birthdate, account number, and social security number) in each sample groups' energy records. These identifiers were taken from the Health Insurance Portability and Accountability Act (HIPPA), one of the first nationally recognized regulations for the use and disclosure of an individual's private information.
- **Response Rate** was the percentage of households in the email and mail solicitation sample group that submitted their home energy information. This rate was calculated with the formula: Response Rate = Total Receive ÷ Total Request.
- **Turnaround Rate** was the average number of days that elapsed between the date that home energy information was requested and received. This rate was calculated by totaling (Day Request -Day Received) for each household in the sample groups for which data was received, and then averaging these total days to determine the overall turnaround rate.

In order to provide a broader perspective on energy data collection methods, the research also included a five-question, telephone peer survey, shown in Appendix E. EE managers were selected from a public website (http://www1.eere.energy.gov/buildings/betterbuildings/neighborhoods/partners.html) for the Better Buildings Program, a national initiative to improve energy efficiency of residential and commercial buildings. This website indicated 35 organizations have active residential energy efficiency programs. Thirty-five EE managers were contacted via

telephone to request their participation in the study. Thirty EE managers responded and agreed to participate, and the study researcher reviewed the purpose of the study. Once they granted their verbal permission to participate in the study, the researcher conducted a five-question survey. The average survey was approximately 10 minutes. Two surveys were excluded because their organization did not have an active residential energy efficiency program. Survey responses were collected for two weeks. Following this period, the survey responses were coded and grouped into five energy data collection categories according to their similarity: utility report, homeowner (survey), Homeowner (mail, email, phone), data mining, and Measurement and Verification Home Assessment. These categories were summarized by calculating the overall percentage of survey respondents that use each data collection method.

FINDINGS

This analysis found that of the four samples of 38 households that were targeted with four different energy data collection methods, the utility report renders the most complete and timely access to pre- and post-retrofit energy information.

Email Solicitation

Durham City/County emailed 364 requests for energy usage data to program participants that received professional retrofits. Of the 38 households included in the sample, 16% responded by emailing their online billing statements to Durham City/County. These participants returned their energy data within 17 calendar days on average. This data collection method yielded the highest completeness rating at 100%. A review of a sample billing statements indicates this data collection method has four

incidences of personal identifiers (name, address, account number and phone) in the energy records.

Mail Solicitation

Durham City/County mailed 71 requests for energy usage data to program participants that received professional retrofits. Of the 38 households in the sample, 24% responded by emailing their online billing statements to Durham City/County. These participants returned their energy data within 13 calendar days on average. No participants responded by mailing copies of their monthly energy billing statements as requested. This data collection method also yielded the highest rating of completeness at 100%. Because each participant in the sample population downloaded and emailed their monthly energy billing statements to the EE manager, the same four types of personal information (name, address, account number and phone) were present in the energy records. Likewise, this data collection method may overburden homeowners. For instance, if homeowners elect to copy and mail their monthly energy statements, they may incur copy and postage fees. These fees may further disincentivize homeowners' participation.

Utility Database

PSNC Energy, a natural gas company and supplier for North Carolina, granted Durham City/County access to their utility database. Each client signed a pre-authorization form, shown in Appendix F, and provided their utility account number to allow third-party access to his or her energy information. Volunteers at Clean Energy Durham, a partnered organization with Durham City/County, manually inputted PSNC Energy account numbers into the company's database to access household energy

records. Once these records were retrieved, the volunteers manually recorded monthly energy data for each household into a spreadsheet.

Despite the on-demand access to energy usage information, Durham City/County was only able to retrieve complete energy records for 50% of the 38 households in the sample group. First, large portions of participating households turned out to not have gas appliances. In addition, of the 50% incomplete records in the sample population, 79% did not have valid PSNC account numbers necessary to access these records. The remaining incomplete records in the sample population were incomplete due to a systems error. In contrast to the other energy data collection methods, this technique had the lowest number of personal identifiers (name, address, account number) in the energy records. However, the process to manually search and log individuals' monthly energy data is very labor-intensive. For organizations with more than 100 program participants, this data collection method may require many hours of staff time each month. Likewise, because this method requires manual data entry, the incidences of data entry errors may increase.

Utility Report

The majority of Durham City/County program participants receive their energy services from Duke Energy. According Duke Energy, in order for Durham City/County to receive an annual report of their program participants' energy records, each client must sign a pre-authorization form, shown in Appendix G. After the authorization forms have been completed, the EE manager may request an annual billing history for the current year and two additional years for each household. Duke Energy has agreed to provide Durham City/County with energy records in an electronic batch report. Nonetheless,

Durham City/County requested this information on 1/19/2012 but did not receive any energy data as of this report's completion on 3/12/2012.

Durham City/County also has three participants who receive their energy services from Piedmont EMC. Similar to Duke Energy, Piedmont EMC requires each customer sign a pre-authorization form. Piedmont EMC returned 100% of the requested records within seven calendar days of the request. The success of this energy data collection method is largely dependent on the timely response of the public utility. This data collection method had the most types of personal identifiers (name, address, account number, phone and email) in the energy records.

Table 5.1 compares each data collection method based on percentages found for the evaluative criteria: completeness, privacy and turnaround rate.[2]

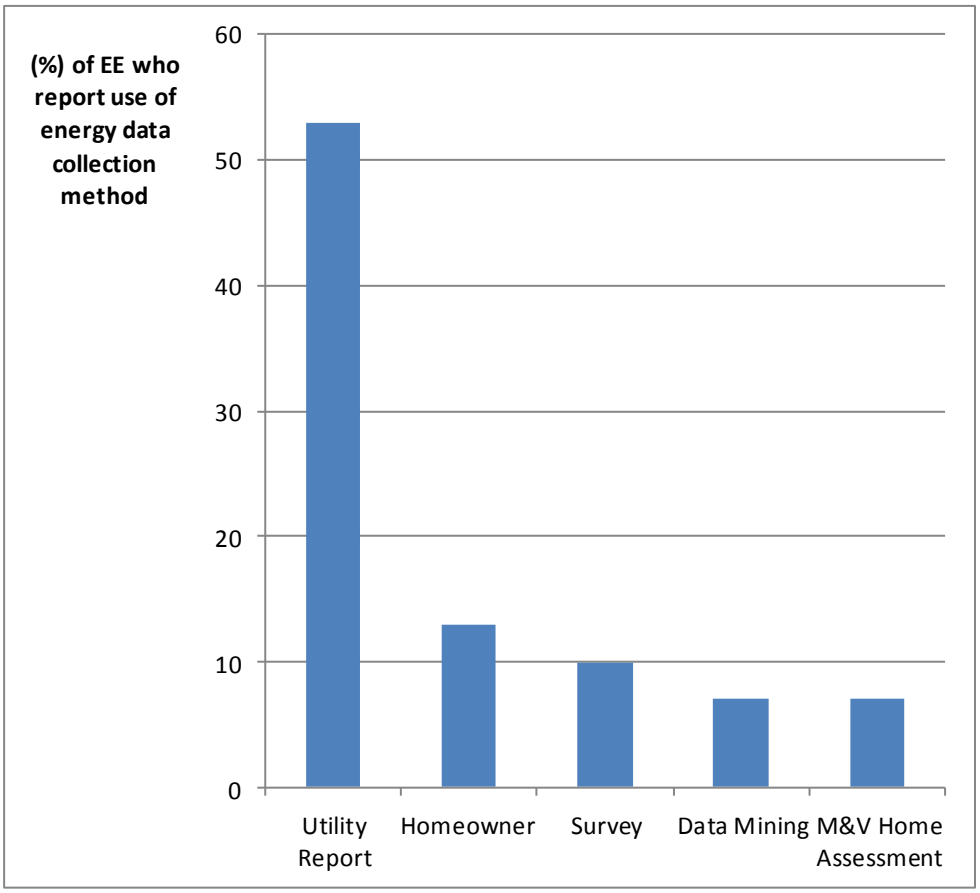
Table 1 Findings from Durham City/County Energy Data Collection Methods

Data Collection Method	Completeness	Privacy	Turnaround
Email Solicitation			
Mail Solicitation			
Utility Database			
Utility Report: Piedmont EMC			

[2] Response rate is only applicable to Email. Mail Solicitation and is not pictured here.

Likewise, of the 85% Better Buildings Program managers who responded to the five-question phone survey, 53% reported that they gather pre- and post-retrofit residential energy data directly from their public utilities. By contrast, 23% of EE managers indicated that they receive their energy data from program participants. Ten percent of EE managers reported that they obtain their energy data from various data mining programs that automatically extract pre-selected data from electronic websites.

Figure 2 Survey of 30 Better Buildings Program Managers Energy Data Collection Methods



In addition to these energy data collection methods, EE managers indicated alternative techniques (not studied in this project) to gather monthly energy data including:

- Phone Solicitation: EE managers call homeowners to record monthly energy information
- Survey: Homeowners complete participant satisfaction questionnaire
- Measurement and Verification Home Assessment: Auditors conduct an in-home assessment to quantify reductions in energy use
- Web Self-Service: Homeowners input monthly energy information online
- Data Mining: Software automatically extracts monthly energy information from websites

IMPLICATIONS

This research has shown that, depending on which energy data collection method they implement, EE managers may have limited access to pre- and post-retrofit energy information. For instance, if an EE manager relies solely on email or mail solicitation to collect household energy information, he or she may encounter a very low response rate. Likewise, if a public utility fails to provide household energy information in a timely manner, as seen in Durham with Duke Energy, the EE manager must seek alternative methods to collect this energy information to satisfy their grantors' requirements.

CONCLUSIONS

Each data collection method has associated advantages and disadvantages. EE managers must decide which data collection method best meets their needs and circumstances. EE managers may find it beneficial to consider the following factors.

Completeness of Information Received

Complete pre and post-retrofit energy information is important to calculate energy use and demand savings, because poor data quality and integrity can have substantial impacts

on the evaluation of EE programs. Of the energy information received, nearly each data collection method used for four sample groups of 38 households in Durham yielded 100% complete pre and post-retrofit energy information. If completeness is most important to an EE manager's program evaluation plan and the number of households providing data is less important, he or she may collect pre- and post-retrofit energy information via email or mail solicitation and a utility report.

Privacy

Research suggests that consumers in the US are most willing to provide demographic and lifestyle information and least willing to provide financial information and personal identifiers (Phelps et al., 2000). In order to access pre- and post-retrofit energy information, EE managers will encounter personal identifiers with any of the above data collection methods. Cogent privacy controls are necessary to protect participants' personal identifiers. EE managers may provide privacy controls by adopting these business practices taken from the Federal Trade Commission (2010).

1. *Collect only the data needed for a specific business purpose.* In order to report aggregate energy use and demand savings, EE managers require monthly energy use and cost data. Such personal information as account numbers and social security numbers are avoidable if EE managers assign each program participant a unique identifier to use when working with the public utility.

2. *Retain data only as long as necessary to fulfill that purpose and safely dispose of data no longer being used*. EE managers should retain pertinent program materials including participants' applications and files until the program funding expires. These materials must be discarded in accordance with their organizations' retention and

disposition policies. However, the tradeoff of disposing these program materials is that they are no longer available to the organization for future analysis or use.

Response and Turnaround Rate

EE managers must have access to timely pre- and post-retrofit energy information to submit federal grant reports. For instance, Durham City/County Sustainability Office must aggregate their energy information to submit a quarterly report to the DOE. Even though homeowners in the email and mail solicitation sample group returned their energy information in less than 30 days, each method had a very low response rate. Response times could be even longer once homeowners must submit energy data monthly. In addition, access to a utility database is helpful to EE managers that need timely energy data. However, the process required to search individual utility records is laborious.

Therefore, this research indicates the utility report renders the most complete and timely access to pre- and post-retrofit energy information. The public utility may provide the EE manager with a monthly reporting of energy records for all participants with completed home energy retrofits. Fifty-three percent of the surveyed Better Buildings Program managers indicate that they collect their energy data from their public utility. In order to use this energy data collection, the EE manager should have a formal agreement with the public utility to provide energy information on a pre-determined schedule.

LIMITATIONS AND FUTURE RESEARCH

As discussed above, there are multiple alternative methods to collect pre- and post-retrofit energy information that this study did not investigate, including: phone solicitation, homeowner survey, Measurement and Verification Home Assessment, web self-service, and data mining. In order to provide a more comprehensive evaluation of

energy data collection methods, future research could evaluate these other energy data collection methods using similar evaluative criteria.

In addition, the energy data collection methods in this study were evaluated in terms of criteria determined by the researcher: completeness, privacy, response and turnaround rate. This research methodology may have excluded other criterions important to evaluate the effectiveness of energy data collection methods, thereby creating a research bias. Future research may survey EE managers for other important factors.

Likewise, each evaluative criterion in this study was observed over a 30-day period. It is possible that findings would differ if data were collected at different times of the year or over longer periods. Future research could address this limitation by evaluating energy data collection methods over different and longer periods.

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APPENDIX A: DATA FIELDS

Data	**Description**	**Example**
Identifier	Unique identifier for homeowner that received professional retrofit	12345
Data Collection	Data collection method used	Mail, Email, Utility Database, Utility Report
Retrofit	Date retrofit completed	MM/DD/YYYY
Data Request	Date utility data requested	MM/DD/YYYY
Data Receive	Date data received from homeowner	MM/DD/YYYY
Name	Is the homeowner's name present in the data collected?	Y/N
Address	Is the homeowner's address present in the data collected?	Y/N
Phone	Is the homeowner's phone present in the data collected?	Y/N
Email	Is the homeowner's email present in the data collected?	Y/N
Birthdate	Is the homeowner's birthdate present in the data collected?	Y/N
Fax	Is the homeowner's fax present in the data collected?	Y/N
SS#	Is the homeowner's social security number present in the data collected?	Y/N
Acct #	Is the homeowner account number present in the data collected?	Y/N
Data Start	Did the homeowner cost submit data for 12 months prior and 2 years post retrofit (Duke)?	MM/DD/YYYY
Data End	Did the homeowner submit use data for 12 months prior and 2 years post retrofit (Duke)?	MM/DD/YYYY

APPENDIX B: Email Solicitation to Homeowners

Congratulations on having completed your home energy retrofit through the City of Durham's Neighborhood Energy Retrofit Program.

As you may recall, we will be monitoring your energy savings over the next couple of years to see how effective the program measures have been. Though we are able to get your energy usage data directly from Duke Energy, we are only able to gather that data once per year. In order to get feedback on the effectiveness of this program sooner and to find additional funding to continue this program, we are soliciting participants to provide your energy data directly through a simple process. If you participate, we will provide you with the results of your home analysis much sooner. If you would like us to be able to begin analyzing your energy savings sooner, please take a couple of minutes to follow the steps below:

1. Go to www.duke-energy.com and log in to your account with your username and password.
2. Choose "Energy Usage & Cost Details" from the menu on the left side of the page, under the "Billing & Payment" heading.
3. Select the "Energy Charges" tab.
4. Select "View All" from the right side of the grey bar across the top of the table.
5. Choose "Export this view" from the light blue bar at the top of the table.
6. This will download a file called "BillHistory.csv"
7. Rename the file "Duke Energy Data.csv"
8. Please email this file to aaron.milano@durhamnc.gov. The Subject line should read: (Duke Energy Data)

If you don't currently have an on-line account, please consider signing up for one. You will have access to some great resources, and it will make analyzing your energy savings much easier. Thank you! We look forward to seeing great savings in the coming years.

APPENDIX C: Mail Solicitation to Homeowners

Congratulations on having completed your home energy retrofit through the City of Durham's Neighborhood Energy Retrofit Program.

As you may recall, we will be monitoring your energy savings over the next couple of years to see how effective the program measures have been. Though we are able to get your energy usage data directly from Duke Energy, we are only able to gather the data once per year. In order to get feedback on the effectiveness of this program sooner and find additional funding to continue this program, we are soliciting participants to provide energy data directly though a simple process. If you participate, we will provide you with the results of your home analysis much sooner.

If you do not track your monthly billing statements electronically, please provide copies of your Duke Energy statements for 1 year prior to your retrofit and each subsequent month following your retrofit. You may mail, email, or fax these copies to:

Aaron Milano
City of Durham Department of Community Development
807 E. Main St. Ste. 2-200
Durham, NC 27701
Email: Aaron.Milano@DurhamNC.gov
Fax: 919-560-4090

If you do not currently have an on-line account with Duke Energy, please consider signing up for one by clicking "Register" at www.duke-energy.com You will have access to some great resources, and it will make analyzing your energy savings much easier.

If you have an on-line account with Duke Energy, you may submit your Duke Energy Statements electronically by following these steps:

1. Go to www.duke-energy.com and log in to your account with your username and password.
2. Choose "Energy Usage & Cost Details" from the menu on the left side of the page, under the "Billing & Payment" heading.
3. Select the "Energy Charges" tab.
4. Select "View All" from the right side of the grey bar across the top of the table.
5. Choose "Export this view" from the light blue bar at the top of the table.
6. This will download a file called "BillHistory.csv"
7. Rename the file "Duke Energy Data.csv"
8. Please email this file to aaron.milano@durhamnc.gov. The Subject line should read: (Duke Energy Data)

APPENDIX D: Survey of EE Managers

EE Manager Data Collection Survey

Q1

Does your organization fund, support, or directly administer a program that provides homeowners with energy efficiency upgrades?

- Yes
- No

Q2

Please estimate how many residential energy efficiency upgrades your organization has completed to date.

- 0
- 1-100
- 101-999
- 1000+

Q3

Please select all that apply. Of the homes that receive energy efficiency upgrades, your organization collects:

- pre-retrofit energy use data
- post-retrofit energy use data
- energy cost data
- behavior based energy efficiency data

Q4

Please explain approaches your organization uses to collect energy efficiency data for homes that receive energy efficiency upgrades (e.g. email to homeowners, annual report from utilities, data mining software, etc.)

Q5

In terms of your organization's methods to collect residential energy efficiency data, rank the following factors in order of importance (most important at the top):

- access to sensitive customer information
- accuracy
- completeness
- costs (printing, mailing, personnel, equipment, telephone charges)
- refusal rate
- response rate
- turnaround rate

APPENDIX E: PSNC Energy Data Disclosure Authorization

This form authorizes Durham City/County Sustainability Office to obtain your household energy consumption information from **PSNC Energy.** The information will be used to determine eligibility for the Durham Home Energy Savings Program and to track the changes in your energy consumption after the energy conservation activities conducted through this program and up through December 31, 2014.

Thank you,

Durham City/County Sustainability Office

I, _____ (PRINT customer name), authorize Durham City/County Sustainability Office to obtain my energy consumption information from PSNC Energy up through December 31, 2014. I understand that Durham City/County Sustainability Office is not responsible for the status of my account.

Signature: _____

Date: _____

Street Address: _____

Apartment: _____

Zip Code: _____

PSNC Account Number: _____

APPENDIX F: Duke Energy Data Disclosure Authorization

DUKE ENERGY DATA DISCLOSURRE AUTHORIZATION

The undersigned customer (the "Customer") of Duke Energy hereby requests that Duke Energy provide the City of Durham the confidential data described below, and consents to the disclosure of such data.

If the data is being furnished to an Affiliate of Duke Energy, the Customer acknowledges that Duke Energy has advised it that, so long as the Customer gives permission by signing a Data Disclosure Authorization, such data will be furnished on a non-discriminatory basis to any provider of energy-related services, whether or not such provider is an Affiliate of Duke Energy, and that Duke Energy has advised it that such energy-related services may be available from other non-affiliated suppliers of energy-related services, at the Customer's request.

Data Description – monthly energy consumption and cost data not to extend beyond June 1, 2014.

Customer:
_____
(Legal Name of Customer)

Address:
_____

By: _____
(Authorized Customer Signature)
(Printed):

_____

Date: _____
Duke Account Number:

_____