Energy Data Collection Methods: The Good, the Bad and the Ugly

By

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Executive Summary
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 upgrades in order to lessen homeowners’ utility bills and improve the comforts and livability of their homes. 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 examines four data collection methods that Durham City/County Sustainability Office employs with 435 homes. This research indicates utility reports offers the most complete and timely access to pre- and post-retrofit energy information.
Acknowledgments

I received assistance from many people over the course of this project. I would particularly like to thank:

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BACKGROUND
The U.S. Department of Energy (DOE) received nearly $42 billion from the American Recovery and Reinvestment Act of 2009 (AARA) for a variety of ongoing or new projects. Three major energy efficiency (EE) 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 Conservation Block Grant Program (EECBG).

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 efficiency upgrades designed to lower their utility bills and energy use. The ACEEE 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” (2011).

Durham City/County Sustainability Office, an intergovernmental initiative to provide 690 Durham homeowners 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 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 upgrades.

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

\[
\text{Energy Savings} = \text{Baseyear Energy Use} - \text{Post Retrofit Energy Use} \pm \text{Adjustments}
\]

Furthermore, the DOE requires reporting metrics for projects supported by WAP, SEP, and/or EECBG funds focus on job creation and retention (including number, type and duration of terms), energy use and demand savings, renewable energy capacity generation and carbon emissions reduction (2010). In order to satisfy federal reporting requirements, Energy Efficiency (EE) program managers 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, describes the process to obtain homeowners’ consent to access pre- and post-retrofit energy information from the public utility as “labor-intensive.” Similarly, once home energy upgrades 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 never 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 information. However, EE managers must decide which data collection method best meets their needs and circumstances. The goal of this project is to provide

\[\text{1 It is unclear if the recent growth of energy efficiency programs will continue after AARA funds expire on September 30, 2015.}\]
EE managers with more information and insight to help guide their energy data collection. Specifically:

1. What methods are EE managers using to collect pre- and post-retrofit energy information?
2. How do four energy data collection methods compare in terms of completeness, privacy, response and turnaround rate?

**RESEARCH 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. This research included a quantitative analysis of four evaluative criteria for each data collection method. The research also included a qualitative, systems analysis of processes that Durham used to collect energy information for program participants. In order to provide a broader perspective on energy data collection methods, the research also included a telephone peer survey of 35 EE managers who are part of the Better Buildings Program, a national initiative to improve energy efficiency of residential and commercial buildings.

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

1. **Email Solicitation**: Email requests were sent to participants to download and forward their online billing statements to EE managers.
2. **Mail Solicitation**: Mail requests 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.

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 survey questions
- **M&V 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

Four samples of 38 households were randomly selected from the groups of households targeted with each of the different data collection method. Durham provided 15 data fields for each household in the sample groups\(^2\), 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

\(^2\) Data Dictionary in Appendix E
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.

EE managers may have access to varied levels of private consumer information dependent on the energy data collection method used. 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:

\[ \text{Response Rate} = \frac{\text{Total Receive}}{\text{Total Request}} \]

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.

ANALYSIS FINDINGS

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 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 Energy³, 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. 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.

In addition, of the 85% Better Buildings Program managers who responded to the phone survey, 53% gather pre- and post-retrofit residential energy data directly from their public utilities. By contrast, 23% of EE managers receive their energy data from program participants. Ten percent of EE managers obtain their energy data from various data mining programs that automatically extract pre-selected data from electronic websites. Figure 3.2 in Appendix H details these findings.

**RECOMMENDATIONS**

Each data collection method varies in terms of different advantages and disadvantages. EE managers must decide which data collection method best meets their needs and circumstances, however there are key factors that make some methods more appealing than others in most circumstances.

**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.

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³ Email correspondence between Durham City/County and Duke Energy
Privacy: Research shows consumers 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 expires. These materials must be discarded in accordance with their organizations’ retention and disposition policies.

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 very low response ratings. This response pattern may slow even greater once homeowners must submit energy data monthly. In addition, access to a utility database is helpful to EE managers that need timely energy data. Yet, the process required to search individual utility records is laborious.

CONCLUSION

This research indicates the utility report offers the most complete and potential timely access to pre- and post-retrofit energy information. The public utility may provide the EE manager with a monthly electronic batch reporting of energy records for all participants with completed home energy retrofits. For instance, 53% of the surveyed Better Buildings program managers indicated that they collect their energy data from their public utility. However, in order to use this energy data collection method, the EE manager must have an agreement and solid working relationship with the public utility to provide this information on a pre-determined schedule. As seen in Durham with Duke Energy, if the public utility fails to provide the agreed pre- and post-retrofit energy information in a timely manner, the EE manager must seek alternative methods to collect this energy information in order to fulfill their grantors’ requirements. To ensure a cooperative relationship, the EE manager and public utility should complete a memorandum of understanding, which contractually obligates the public utility to provide the agreed energy information on a pre-determined schedule.

The recommended energy data collection method, detailed in Appendix J, include the following steps:

1. EE manager submits electronic copies of authorization forms to public utility
2. EE manager submits monthly request for electronic batch reporting of households’ energy records for all participants with completed home energy retrofits
3. Public utility returns requested electronic batch report to EE manager in 30 calendar days
4. EE manager analyzes data
5. EE manager submits quarterly reports to grantors
6. EE manager requests updated monthly households’ energy records for all participants with completed home energy retrofits until the program expires
WORKS CITED

United States; Recovery Board; Advanced Recipient Data Search; Department of Energy. Web. 28 Feb. 2012.
http://www.recovery.gov/pages/textviewprojsummary.aspx?data=recipientAwardsList&Agency=89&AwardType=CGL


Appendix A: 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 B: 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 C: Duke Energy Data Disclosure Authorization

DUKE ENERGY DATA DISCLOSURE 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: ___________________
Appendix D: 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 E: Data Dictionary

<table>
<thead>
<tr>
<th>Data</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
<td>Unique identifier for homeowner that received professional retrofit</td>
<td>12345</td>
</tr>
<tr>
<td>Data Collection</td>
<td>Data collection method used</td>
<td>Mail, Email, Utility Database, Utility Report</td>
</tr>
<tr>
<td>Retrofit</td>
<td>Date retrofit completed</td>
<td>MM/DD/YYYY</td>
</tr>
<tr>
<td>Data Request</td>
<td>Date utility data requested</td>
<td>MM/DD/YYYY</td>
</tr>
<tr>
<td>Data Receive</td>
<td>Date data received from homeowner</td>
<td>MM/DD/YYYY</td>
</tr>
<tr>
<td>Name</td>
<td>Is the homeowner’s name present in the data collected?</td>
<td>Y/N</td>
</tr>
<tr>
<td>Address</td>
<td>Is the homeowner’s address present in the data collected?</td>
<td>Y/N</td>
</tr>
<tr>
<td>Phone</td>
<td>Is the homeowner’s phone present in the data collected?</td>
<td>Y/N</td>
</tr>
<tr>
<td>Email</td>
<td>Is the homeowner’s email present in the data collected?</td>
<td>Y/N</td>
</tr>
<tr>
<td>Birthdate</td>
<td>Is the homeowner’s birthdate present in the data collected?</td>
<td>Y/N</td>
</tr>
<tr>
<td>Fax</td>
<td>Is the homeowner’s fax present in the data collected?</td>
<td>Y/N</td>
</tr>
<tr>
<td>SS#</td>
<td>Is the homeowner’s social security number present in the data collected?</td>
<td>Y/N</td>
</tr>
<tr>
<td>Acct #</td>
<td>Is the homeowner account number present in the data collected?</td>
<td>Y/N</td>
</tr>
<tr>
<td>Data Start</td>
<td>Did the homeowner cost submit data for 12 months prior and 2 years post retrofit (Duke)?</td>
<td>MM/DD/YYYY</td>
</tr>
<tr>
<td>Data End</td>
<td>Did the homeowner submit use data for 12 months prior and 2 years post retrofit (Duke)?</td>
<td>MM/DD/YYYY</td>
</tr>
</tbody>
</table>
Appendix F: The Human Research Protection Program: HIPAA - PHI List of 18 Identifiers

1. Names *

2. All geographical subdivisions smaller than a State, including street address, city, county, precinct, zip code, and their equivalent geocodes, except for the initial three digits of a zip code, if according to the current publicly available data from the Bureau of the Census: (1) The geographic unit formed by combining all zip codes with the same three initial digits contains more than 20,000 people; and (2) The initial three digits of a zip code for all such geographic units containing 20,000 or fewer people is changed to 000. *

3. All elements of dates (except year) for dates directly related to an individual, including birth date, admission date, discharge date, date of death; and all ages over 89 and all elements of dates (including year) indicative of such age, except that such ages and elements may be aggregated into a single category of age 90 or older. *

4. Phone numbers *

5. Fax numbers *

6. Electronic mail addresses *

7. Social Security numbers *

8. Medical record numbers

9. Health plan beneficiary numbers

10. Account numbers *

11. Certificate/license numbers

12. Vehicle identifiers and serial numbers, including license plate numbers

13. Device identifiers and serial numbers

14. Web Universal Resource Locators (URLs)

15. Internet Protocol (IP) address numbers

16. Biometric identifiers, including finger and voice prints

17. Full face photographic images and any comparable images

18. Any other unique identifying number, characteristic, or code (note this does not mean the unique code assigned by the investigator to code the data)

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*HIPPA-PIH personal identifiers in research
Appendix G: 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 H: Table 3.1 Findings from Durham City/County Data Collection Methods

<table>
<thead>
<tr>
<th>Data Collection Method</th>
<th>Completeness</th>
<th>Privacy</th>
<th>Turnaround</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email Solicitation</td>
<td>![Blue Full Circle]</td>
<td>![Half Blue Circle]</td>
<td>![Half Blue Circle]</td>
</tr>
<tr>
<td>Mail Solicitation</td>
<td>![Blue Full Circle]</td>
<td>![Half Blue Circle]</td>
<td>![Half Blue Circle]</td>
</tr>
<tr>
<td>Utility Database</td>
<td>![Half Blue Circle]</td>
<td>![Blue Full Circle]</td>
<td>![Blue Full Circle]</td>
</tr>
<tr>
<td>Utility Report: Piedmont EMC</td>
<td>![Blue Full Circle]</td>
<td>![Half Blue Circle]</td>
<td>![Half Blue Circle]</td>
</tr>
</tbody>
</table>

5 These comparisons do not include data from Duke Energy, because Durham/City County did not receive the requested data from Duke Energy during the 30-day observation period.
Appendix I: Figure 3.2 Survey of 30 Better Buildings Program Managers: Energy Data Collection Methods

![Bar Chart: Energy Data Collection Methods](chart.png)
EE Manager Collects Pre- and Post-Energy Data from Public Utility

**EE Manager**

- Request energy data
- Analyze data report
- Report data to grantors
- Request updated energy data
- Program expire

**Public Utility**

- Compile utility data report
- Return requested data

- Authorization form
- Data report
- Quarterly
- Monthly
- 30 days