

**Northwest Energy Efficiency Alliance
Request for Proposals
Residential Building Stock Assessment Study
#40135**

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| <p>Proposals Due: April 9, 2010 Intent to Respond Due: March 11, 2010</p> |
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1. Introduction

This request for proposals seeks professional services to conduct a Residential Building Stock Assessment on behalf of the Northwest Energy Efficiency Alliance (NEEA).

NEEA is a non-profit corporation supported by electric utilities, public benefits administrators, state governments, public interest groups, and energy efficiency industry representatives that operate in the states of Idaho, Montana, Oregon, and Washington. These entities work together to make affordable, energy-efficient products and services available in the marketplace. Additional information about NEEA can be found at our website at <http://www.nwalliance.org>.

This is a fixed fee contract.

2. Background

Since its beginning, NEEA has conducted region-wide studies that inform planning needs for Oregon, Washington, Idaho and Montana, as well as those of individual energy efficiency organizations. NEEA's role as a managing agency was reaffirmed through of the work conducted by the Northwest Energy Efficiency Taskforce in 2009. In this capacity, NEEA will work with the Bonneville Power Administration to meet their needs for planning in the public power territory. NEEA will also coordinate with both investor owned utilities and individual public power entities to supplement regional study data collection activities through oversampling.

3. Research Objectives and Key Questions

The primary objective of this study is to develop an inventory/profile of existing residential building stock in the Northwest region, based on data from a sample of existing homes. This study will establish a regional baseline for 2010 housing stock for three categories of residences: single-family homes, multi-family homes and manufactured homes. Notionally previous research suggests that this can be achieved by sampling approximately 800-1200 homes across the region.

NEEA, its funders and stakeholders are interested in comparing the collected data and analysis in from four geographic perspectives: Whole Region, by state, by whole BPA service territory; and by BPA sub-region.

| | Regional (Four state area) | State (OR, WA, ID, MT) | Whole BPA Service Territory (a.k.a. NW Public Power) | BPA Sub- Regions (Puget Sound, Western OR, Western WA, Eastern OR/WA, ID/MT) |
|----------------------|---|---------------------------------------|--|---|
| Single-Family | +/- 5% with 95% Confidence | +/- 5% with 95% Confidence | +/- 5% with 95% Confidence | +/- 5% with 95% Confidence |
| Multi-Family | +/- 5% with 95% Confidence | +/- 5% with 95% Confidence | +/- 5% with 95% Confidence | +/- 5% with 95% Confidence |
| Manufactured | +/- 5% with 95% Confidence | +/- 5% with 95% Confidence | +/- 5% with 95% Confidence | +/- 5% with 95% Confidence |

In addition, individual utilities may be interested in understanding their data from the perspective of their own service territory. For these utilities, the bidder must provide a guide as to how a utility would contract for oversampling and analytical services for their service territory that would augment the larger, NEEA-sponsored, regional study. For each utility that contracts for oversampling and/or analytical services, the selected bidder must provide, as a component of its final report to NEEA, a comparison of statistically significant difference by state and region.

For the larger regional study any utility-specific oversampling, the bidder must describe the method by which they plan to obtain data to develop a sample as a list of utility customers may not be available for all service territories. Any such method must include telephone numbers and zip codes.

The expected outputs of this study are:

1. Statistically representative samples of the region single-family homes, multi-family homes and manufactured homes from a combination the following data collection activities:
 - a. An initial survey of potential respondents to collect general home characteristics and to serve as a recruiting tool for on-site sampling. Bidders must recommend a survey methodology that uses the most appropriate survey method or combination of survey methods (mail, phone, e-mail, etc.) to minimize sample bias.
 - b. On-site visits of a representative sample of northwest homes.
 - c. Other data collection activities as proposed by bidders and agreed to by NEEA.

Note that all data collection should be nested where possible and leveraged at every opportunity.

2. A regional database of residential existing stock characteristics, based upon responses from the above sample and data collection activities that is available to all NEEA partners. This database (in Microsoft Excel) should include weighting information (e.g. building type, heating fuel, weather, etc.)

3. A calculated estimate of a whole-house Energy Use Index (EUI) for residential homes, by residence category (single -, multi-family, and manufactured home), for each heating type and regional classification based on billing data and home characteristics.
4. A report summarizing all findings.
5. One or more presentations regarding findings.

The first phase of data collection will be a survey of potential respondents. Per 1-a above, bidders must recommend a survey method or combination of survey methods that minimizes sample bias. This survey will include more respondents than the following on-site visits. The survey will serve a logistical function, providing releases for billing data and the on-site audit, ensuring that sufficient billing information is available for the visits. Additionally, the survey will provide information on general home characteristics, which can then be verified through on-site inspection and serve as a method to cross-check phone surveys against on-site characteristics. In some cases for utility oversampling, the utility-specific sample may be drawn from previous randomly selected participants from a recent Residential Customer Characteristics Study. Since previous participants will not be available for all areas, bidders must propose a methodology to draw an appropriate sample in such circumstances.

The on-site visits will collect information about the building as well as energy-using equipment. This includes heating and cooling equipment, envelope and glazing characteristics, appliance types and plug load characteristics. Auditors will perform a socket saturation survey, collect detailed data on consumer electronics and conduct flow tests of showerheads. Some of the data collected might need to be referenced with external data sources to establish equipment efficiency levels. Given the time required of the home-owner or tenant to facilitate the on-site visit, the bidder should estimate an appropriate incentive.

Once data are collected, the bidder will develop a database, which will be made available to NEEA funders. Important elements of the database include all data collected for the following: (1) HVAC (electric and gas); (2) Lighting and socket saturation; (3) water heating (electric and gas); (4) envelope and glazing characteristics; (5) plug load characteristics; (6) appliances; and, (7) showerheads. Data will be cleaned to remove any proprietary information.

In order to determine EUI by heating type, the bidder will collect relevant utility billing records, analyze these records and develop a weather normalized whole house EUI for each building and heating type.

A study of this magnitude will require significant coordination with regional utilities. Contractors should consider the time required to coordinate with NEEA and utilities for billing data collection and any other needed coordination, as well as providing a plan to ensure that coordination occurs in a timely manner. Bidders must describe their intended methods of project management and utility coordination to insure smooth execution of data collection and collaboration among all relevant stakeholders.

4. Study Elements

The study will include the following:

- 4.1 Detailed characteristics of a representative regional sample of existing residential single family; multi family and manufactured homes. Information on building envelope, HVAC, lighting, appliance stocks and plug loads will be collected. An example of an on-site survey instrument can be found in Appendix C. Bidders should be advised that this is only an example and should not be considered the final document for use in this study.
- 4.2 Homeowner behavioral characteristics. Data may be collected as part of the on site visit; by email; by-post survey; or by a combination of methods. The data may include but are not limited to the following lighting replacement behavior, weatherization related upgrades, energy use and other energy consumption-related behavior, and basic demographics. Furthermore, bidders should explain how they intend to nest each data collection activity in order to achieve maximum results.
- 4.3 An analysis of weather normalized whole-house energy use (electricity, gas, oil, propane, wood etc) for each regional/heating-type subgroup, based on a full year of actual electric and gas billing data for homes in the sample.
- 4.4 In addition to the oversampling mention in Section 3, there is interest in the region to conduct several optional studies in conjunction with this regional building characterization. Therefore, bidders should provide NEEA with options that include any or all of the following studies on a sub-sample of single family homes:
 - a) An option to estimate lighting hours of use at the household level, on a sub sample across all home types.
 - b) An option to conduct a blower door test to determine whole house leakage.
 - c) An option to meter at the end-use level. This involves the installation of whole house, space and water heating energy use meters. However bidders may suggest additional elements or alternate methods for consideration.
 - d) An option to meter consumer electronics hours of use. These include TVs, computers and gaming systems.

Pricing for optional studies should be provided as incremental (the additional price for including each option) as well as per-visit, including analysis. Given economies of scale the per visit pricing structure may vary depending on the total number of sites visited, which should be reflected in the pricing structure. This will provide the information for regional entities to decide on the scale and scope of investing in additional work.

5. Deliverables

5.1 Work Plan

The Evaluation Contractor shall submit a draft work plan to be presented and discussed at a kick-off meeting. The plan will describe how the Evaluation Contractor will proceed with the research, data collection, analysis, report preparation, and other proposed activities. The plan will consist of the following:

- Proposed sampling methodology per home type

- Methodologies to be used for each component of the evaluation
- Schedule of the major evaluation tasks, including start up, milestones, and completion dates for each task;
- High-level outline of evaluation reports;
- Time and effort required for each major evaluation task; and
- Party responsible for each task.

Agreed-upon revisions will be incorporated into a final version that will serve as the basis for the final statement of work that is an attachment to the contract between NEEA and the evaluation contractor. It shall specify the responsible party for each task.

5.2 Tracking Data Collection

As negotiated between the NEEA evaluation project manager and the Contractor, the Contractor will provide sample disposition reports by collection protocol, study cell/stratum on either a weekly or monthly basis.

5.3 Sample Design Memo

The Contractor shall deliver a memo which describes the final agreed upon sampling approach and details the sampling methodology and recruitment plans.

5.4 Survey/Data Collection Instrument(s)

The Contractor will submit proposed instruments should to the NEEA evaluation project manager. The Contractor and NEEA evaluation project manager will edit the proposed instrument together. All final instruments will be subject to approval by the NEEA evaluation project manager. Each final instrument must be included in one of the appendices of the final report.

The Contractor shall deliver all survey/data collection instruments and recruitment materials to the NEEA project manager for review and feedback. The NEEA project manager must sign off on all final instruments.

5.5 Database of Building Characteristics

The Contractor shall deliver all on-site data collected to NEEA in a database format that is easily interpreted and user-friendly. The database should include a detailed data dictionary. Bidders should consider a web-interface for this design, or a similar method to facilitate the easy dissemination of data.

5.6 Presentations and Status Updates to Regional Groups including the Northwest Research Group and Regional Technical Forum

The Contractor should anticipate presenting findings to regional stakeholders on an as-needed basis. This could include presentation to the RTF as well as the Northwest Regional Research Group. Additionally, the contractor will need to provide bi-monthly status updates to NEEA's project manager as well as coordinate with NEEA regular status updates on the project to a core group of stakeholders via monthly conference calls.

5.7 Reports

This contract will include the delivery of two reports, a characteristics report for building types and an energy analysis report.

The building characteristics report will summarize findings from on-site visits to homes, including building characteristics, lighting saturation, appliances including consumer electronics, and plug loads. This report will also include findings from the homeowner surveys (see 4.2 and 4.3).

The energy analysis report will focus on the evaluation of whole-home usage. If the option for end-use metering and lighting analysis is accepted, then this report would also include those data. Both reports will explain the methodologies used and the rationale for why they were chosen. In addition, both reports will include executive summaries that provide a concise synopsis of the most salient findings.

The evaluation contractor must submit a report outline to the NEEA evaluation project manager prior to drafting the report. This outline should serve as a basis for discussion between the contractor and the project manager, to ensure that both parties agree to the report structure.

Reports must be provided in draft form to NEEA evaluation project manager. This draft will be reviewed and commented on by NEEA staff, and other parties deemed appropriate by NEEA. Based on these comments, the evaluation contractor shall make revisions and deliver to NEEA a final version of the report. It may require more than one iteration between the evaluation contractor and NEEA to achieve an acceptable final report. Where applicable, data, phone conversations, non-confidential sources, publications, and other media used in the report must be referenced and cited. (It is anticipated that any respondents or sources can be promised confidentiality in terms of attribution of their responses in the written report.) Findings and conclusions shall be based on the information collected by the evaluation contractor and referenced in the report. The use of tables and graphs is recommended for visual representation of important findings and for material that does not lend itself well to narrative form

The evaluation project manager may request other deliverables as necessary to support the project. These will usually be in the form of interim memos or “white papers” whose information will later be incorporated into the final report. As such, these deliverables should be considered covered under the existing work plan. If the contractor feels that a request cannot reasonably be accomplished under the existing work plan s/he should discuss this concern with the NEEA evaluation project manager at the time of the request.

Table 2. Schedule Key Deliverables

| | Date |
|-----------------------------------|----------------|
| Kickoff Meeting | Mid June 2010 |
| Work & Sampling Plan Finalized | Mid-July 2010 |
| Questionnaire Design/Data | Mid July 2010- |

| | |
|----------------------|---------------|
| Collection/Analysis | March 2011 |
| Delivery of Database | June 2011 |
| Draft Report | August 2011 |
| Billing Analysis | October 2011 |
| Final Report | December 2011 |

6. Product Quality

Bidders should be aware that NEEA reports are usually the only published documents for NEEA projects. Because of this, it is critical that both the presentation and the content of these reports be of the highest quality. Bidders who are not completely confident of their writing skills are strongly urged to retain the services of a professional editor. NEEA reserves the right to reject and withhold payment for any document that is not clearly written, grammatically correct, or does not use Standard English. The bidder is responsible for obtaining and using the most up-to-date NEEA Style Guide.

7. Proposal Submission and Selection

7.1 Contents

Each primary bidder must propose a workplan that satisfies all tasks and goals required by this RFP, but may recommend sub-contractors for specific tasks. Each primary bidder must address the following in their proposals:

- Proposed specific tasks that will be conducted in order to meet the objectives and deliverables specified in this RFP.
- Proposed methodologies/approach for accomplishing proposed tasks.
- Proposed timing for specific tasks and deliverables.
- High-level outline of contents to be included in the final report.
- Proposed staffing and qualifications of proposed staff.

Proposed staffing—team composition and personnel—is a significant factor in bidder selection. As such, bidders should carefully consider this element of the proposal. In particular, bidders should clarify staffing qualifications related to:

- questionnaire design
- data analysis
- report writing
- Estimate of time and materials required to complete each of the proposed tasks, including the dollars and hours per staff estimated for each task (i.e. a cost matrix). This includes details on a per site visits average cost, as well as site visit with each additional optional task, such as blower door test, lighting metering and end use metering.
- If bidding on more than one NEEA residential market research or evaluation project, any synergies or benefits anticipated.
- All bidders must submit applicable writing samples for review. Proposals that do not include these materials will not be considered. All materials will be returned following final contractor selection.

Proposals must not exceed 15 pages. Information on staff and firm qualifications should be included as an appendix to the proposal and is not included in this 15-page limit. Bidders must reference the project number on the title page of the proposal.

7.2 Intent to Respond

NEEA will only consider proposals from parties who have submitted an “Intent to Respond” form (Appendix A) indicating their intent to respond. All Intent to Respond forms must be received by NEEA no later than 4:00 p.m. Pacific Daylight Time on Wednesday, March 10, 2010. Only those parties submitting the Intent to Respond form will be provided with updates to the RFP receive answers to questions for all bidders to view, and have their proposals considered.

7.3 Submission

Proposers must submit an electronic copy (MS-Word, any version) and one hard copy of their technical and cost proposals by 4:00 PM Pacific Time on Friday, April 9, 2010 to:

Anu Teja
Market Research and Evaluation Project Manager
Northwest Energy Efficiency Alliance
529 SW Third Avenue, Suite 600
Portland, OR 97204
Phone: (503)827-8416 x221 or 800-411-0834 x221

Electronic proposals should be sent to: ateja@nwalliance.org.

FAXED PROPOSALS WILL NOT BE ACCEPTED.

7.4 Selection

Bidding firms will be rated in terms of:

1. Responsiveness to the RFP and demonstrated understanding of the issues surrounding the evaluation of the project.
2. The thoughtfulness and appropriateness of the proposed data collection and analysis plan for completing the project.
3. The experience and qualifications of the individuals specifically proposed to manage and conduct the evaluation. NOTE: Proposed staffing is a significant factor in bidder selection. As such, no changes in key staff–substitutions or changes in roles/responsibilities--can be made without the written agreement of NEEA evaluation project manager.
4. The experience of the firm or team of firms making the proposal.
5. The management plan for carrying out the evaluation, including past experience at working together if there are multiple entities represented in the bid.
6. Cost: the cost of the contract should be bid as time and materials, not to exceed basis. The level of effort and time devoted by key staffers will be a consideration.

NEEA is under no obligation to select any proposal that results from this solicitation, nor is there any obligation or intent implied to reimburse any party for the cost of preparing a proposal in response to this RFP. NEEA encourages proposers to submit proposals that include innovative methods or tasks in addition to or different from those listed in the RFP.

APPENDIX A – INTENT TO RESPOND FORM

Request for Proposals
For a
Project Evaluation for
Residential Building Stock Assessment Study

PLEASE PRINT:

Company: _____
Address: _____
Contact Name: _____
Contact Title: _____
Telephone #: _____
Facsimile #: _____
E-mail Address: _____

The company named above intends to submit a proposal in response to NEEA’s RFP for an evaluation contractor for the Residential Building Stock Assessment Study Deadline for submission of this “Intent to Respond” form is no later than 4PM). Pacific Daylight Time on Thursday March 11, 2010

Signature of authorized representative: _____
Name: _____
Title: _____
Date: _____

Submit to:

Anu Teja
Market Research and Evaluation Project Manager
Northwest Energy Efficiency Alliance
529 SW Third Avenue, Suite 600
Portland, OR 97204
Phone: (503) 827-8416 x221 or 800-411-0834, x221
Fax: 503-827-8437

Appendix B – NEEA Style Guide

Market research report structure

NEEA evaluation reports will, ideally, not exceed 50 pages in length (excluding appendices) and will be structured as follows:

- **Executive Summary**
 - Audience: Executive audiences, including NEEA senior management and Board of Directors.
 - Purpose: An executive summary stands alone as a representation of the report's most important findings and conclusions. The summary does not serve as an introduction or abstract of the report itself. Rather, it distills the report's key issues into salient points.
 - Subjects include but are not limited to:
 - Summary of key building characteristics, as evidenced by the empirical data collected as part of the evaluation.
 - Other major findings that explain the project's progress or lack thereof, that may affect its future progress or that are otherwise actionable.
 - Primary conclusions based on the major findings.
 - Synopsis of recommendations.
 - Recommended format/length:
 - Standalone section of the report
 - 2-3 pages with limited or no graphics.

- **Introduction**
 - Audience: All readers.
 - Purpose: Provides the key goals of the study. This section of the report provides an understanding of “why” NEEA conceived the project and “where” it is going. The introduction is not a condensed version of the evaluation. Rather, it provides context to understand “what” is being evaluated.
 - Subjects include:
 - Summary description of the project and its evolution, including key events/milestones
 - Recommended format/length:
 - Chapter 1 of the report
 - 5 pages.

- **Findings by Data Collection Activity**

- Audience: Readers who are interested in the methodology and specific findings of all or some of the data collection activities summarized in chapter 2. (Those who are not interested in these details will skip to the conclusions and recommendations, which will synthesize these findings.)
- Purpose: Provides details on each data collection activity, including a description of the methodology and highlights from the survey and analysis. The findings comprise the core of any evaluation, because they are the basis for all conclusions and recommendations. In order to keep the report length reasonable, the report writer should limit the material in this section to that which provides valuable insight to the goals and objectives of the study. Data or detail that may be valuable as reference information should be placed in an appendix to the report.
- Typical subjects of these chapters:
 - Summary of data collection/analysis methods, including sample size, population size, statistical significance, and any challenges
 - Summary of key findings
 - Data tables/charts illustrating key points
 - Comparison to previous findings and/or findings from other sources/regions
- Recommended format/length:
 - The structure of the findings section of the report will depend on the data collected for the report. The evaluation contractor should consult with the NEEA evaluation project manager prior to writing the report to decide on the appropriate chapters/structure for this section of the report.
 - Typically, there will be multiple chapters with each one dedicated to a specific data collection/analysis effort or topic.
 - Length will vary significantly based on the volume of data collection/analysis activities. The evaluation contractor should consult with the NEEA evaluation project manager regarding appropriate length.

- **Conclusions/Recommendations**

- Audience: All readers.
- Purpose: This section will describe the implications of the observations and analyses in the previous chapters. It is not sufficient to simply restate the findings. Rather, in this section the report writer must synthesize findings from the various data collection activities in order to present a set of well-reasoned conclusions and recommendations if applicable along with their respective implications. NOTE: All conclusions must be based on findings from the data collection activities and analyses documented in previous sections, or the writer should note otherwise.
- Recommended format/length:
 - This section is the final chapter of the report

- NEEA’s goal is for this section to draw conclusions based on a synthesis of the most important findings of evaluation, and make recommendations based on those conclusions. There is no fixed order to how conclusions should be presented; rather, NEEA expects the report writer to organize this chapter in a manner that tells a cohesive story.
 - 10 pages or less.
- **Appendices**
 - Audience: Readers who want more detail regarding specific aspects of the previous sections.
 - Purpose: This section is the repository for examples, lists and graphics that, while important, are not necessary to understand the context of the project or the conclusions of the evaluation.
 - Appendices content examples:
 - Survey instruments or interview guides.
 - Comprehensive responses to surveys.
 - Detailed organizational or flow charts.
 - Itemized key market and performance indicator lists.
 - Descriptions of intervention methods and schedules.
 - Explanation of statistical analysis methods.
 - Recommended length: Unlimited.

Purpose

The purpose of all evaluation writing is to “provide unbiased, independent, empirically based information to decision-makers.” These decision-makers include the Northwest Energy Efficiency Alliance (NEEA) Board of Directors, partners/stakeholders, project planning staff, and implementation staff/contractors.

Syntax and writing style

NEEA values clarity in report writing over all other aspects of style and syntax.

There are as many ways to write reports as there are contractors and projects, but the following three maxims provide good rules for writing NEEA evaluation reports:

- Brevity is preferable to length – but not at the expense of key information.
- Let graphics tell their story with a minimum of accompanying text.
- An active voice conveys more meaning than a passive voice.

Regarding the last maxim, compare the following two sentences:

The marketing activities were completed before the end of the funding cycle. (Passive)

The contractor completed the marketing activities by the end of the funding cycle. (Active)

Both of these sentences are true and approximately the same length. However, they do not convey the same degree of meaning. The first sentence provides no understanding of who completed the marketing activities. The second (active) sentence tells us that it the contractor

who was responsible for the completion. Accurate and informative evaluations provide the reader with a clear understanding of cause, effect and responsibility. The active voice is a more effective way to deliver this information.

Format and pagination

Report writers must deliver their final reports in Microsoft Word in Times New Roman.

Other than pages from the executive summary and appendices, reports must use sequential pagination rather than sectional pagination. That is, the introduction must begin with page “1” and continue in succession through the last page of the Conclusions / Recommendations section. The reports must not be paginated by section, as in 1-1, 1-2, 1-3, followed by 2-1, and 2-2, etc.

The report writer may number figures and tables consecutively or by section.

Jargon (including acronyms)

NEEA contracts for the evaluation of sophisticated technical projects that may not be familiar to all audiences. Each of these projects seems to spawn a language of its own. Report writers should define and regulate the use of these terms so that all audiences will understand the report.

Specifically, report writers must define all technical terms and acronyms upon their first occurrence in the report. In addition, the report writer should include a glossary of technical terms and acronyms in the appendices of the report when appropriate, so that readers may refer to a central source for all technical terms and acronyms.

Grammar, spelling and punctuation

NEEA expects all report writers to use proper grammar, spelling and punctuation when developing reports. *The Elements of Style* (Strunk and White) is an excellent resource for all who write for NEEA.

Citation

Report writers must accurately and properly cite all text references, as well all graphs and tables in NEEA evaluation reports in accordance with the *Chicago Manual of Style*.

Font size and margins

Report writers will use Times New Roman font in NEEA evaluation reports with font size for text must be 12 points. Writers may use smaller fonts in footnotes, text in tables or exhibits. All margins (top, bottom, left and right) should be 1 inch.

Report Cover

The MPER cover will include: the title of the Project or Initiative and MPER number; the date of publication; and the name of the evaluation firm. The cover must *not* include any graphics other than line-art.

Other evaluation topics and issues

- **Expert opinion and empirically-based findings** – For most projects or initiatives, NEEA has chosen specific contractors because of their expertise related to the evaluation subject. It is appropriate for the contractor to provide analysis based on this expertise. However, it is also critical that the report writer distinguish between conclusions based on this expertise as opposed to findings based on interviews, surveys or direct observation.
- **Data integrity and limitations** – Report writers should discuss, in the appropriate sections of the report, their efforts to gather and organize data in an objective and efficient manner. Further, the report writer should discuss data collection techniques used to assure data quality following collection. Finally, the report writer should provide a description of the limitations of the data relative to the report's findings and conclusions.

APPENDIX C - ON-SITE SURVEY INSTRUMENT

Northwest Energy Efficiency Alliance Single-Family Residential Existing Construction Stock Assessment Appendix
July 26, 2007

Onsite Survey Instrument

Customer: _____ Customer ID # _____

Address _____

City: _____ MO# _____

Phone: _____

Inspector _____

Date _____ Time _____

Occupant Interview - Introduction

Hello, my name is _____ with RLW Analytics, working on behalf of (UTILITY NAME).

I'm here to meet with _____. (Show identification and business card.)

[Customer should be expecting inspector].

On-Site Interview

During my visit I'll be asking a few questions about your home's primary lighting fixtures and major appliances. Then I'll go on to inspect your heating and cooling equipment, washer, dryer, dishwasher, refrigerator, freezer, water heating equipment, and the insulation levels in your home. Do you have any questions regarding my visit?

General Information

1. Type of Residence?

- Single Family, Unattached, One story
- Single Family, Unattached, Two story
- Single Family, Unattached, Three or more stories
- Townhouse or Rowhouse
- Duplex, Triplex, or Quadplex
- Apartment/Condo with more than 4 units (1 or 2 stories)
- Apartment/Condo with more than 4 units (3 or more stories)
- Mobile Home, Single Wide
- Mobile Home, Double Wide
- Mobile Home, triple Wide
- Modular/prefabricated
- Other _____

2. What month/year did you move into home? _____

3. How many people live in this household in the following age ranges?

- Under 1 year _____
- 2 to 5 years _____
- 6 to 18 years _____
- 18 to 29 years _____
- 30 to 49 years _____
- 50 to 64 years _____
- 65 or more years _____

4. Number of people working outside the home? _____

5. Do you operate a business out of the home?

- Yes
- No

6. Do you rent or own this home?

- Own/Buying
- Rent
- Occupied without payment of rent

Who pays the electric bill? Occupant Landlord

Who pays the gas bill? Occupant Landlord

7. Do you obtain public assistance in paying bills?

- Yes
- No
- Don't Know
- Refused

7a. If (7, yes) _____% of total electric NA DK
 _____% total gas NA DK

8. Participated in electric utility efficiency program during the last year?

- Yes
- No (skip next)

9. If yes what measures?

- audit
- lighting
- heating system
- cooling systems
- windows
- insulation
- caulking/WS
- water heater
- other_____

10. Participated in gas utility efficiency program during the last year?

- Yes
- No (skip next)

11. If yes what measures?

- audit
- heating system
- windows
- insulation
- caulking/WS
- water heater
- other_____

12. What is the total annual income for the home?

- < \$25,000
- \$25,001 - \$50,000
- \$50,001 - \$75,000
- \$75,001 - \$100,000
- \$100,000
- D/K
- Refused

13. In what year was the house built? _____ (Only one source for the age of the residence is needed)

13a Source:

Auditor B.

Customer

- Age: <1950
- 1950-1959
- 1960-1969
- 1970-1979
- 1980-1990
- 1991-1995
- >1995

14. What is the total conditioned floor area of the home?

- Fewer than 600 square feet
- 600 to 999 square feet
- 1,000 to 1,599 square feet
- 1,600 to 1,999 square feet
- 2,000 to 2,399 square feet
- 2,400 to 2,999 square feet
- 3,000 or more square feet
- Don't Know

15. Do you have a garage?

- No
- Single
- Double
- Triple

16. Is the garage heated?

- No heat
- Electric Heat
- Gas Heat
- Propane
- Wood stove
- Other

17. Frequency of use?

- Never
- Very Little
- Sometimes
- Often

Thermostat Information

18. Thermostat type:

- Digital
- Hybrid
- Mechanical
- Not Observed
- Other

1. Heating: Daytime Temp: _____/OFF

Nighttime Temp _____/OFF

Cooling: Daytime Temp: _____/OFF/No Cooling

Nighttime Temp _____/OFF (not used)

Heating Information

20. Primary heating system fuel type:

- Gas
- Fuel Oil
- Electricity
- Wood: cords per year _____
- Kerosene
- Solar
- Propane

21. Primary heating system type:

- Wall
- Heat pump w/ electric supplement
- Heat pump w/o electric supplement
- Forced Air Furnace
- Portable
- Hydronic System
- Floor
- Ceiling Cable
- Fireplace
- Window Unit Resistance
- Woodstove
- Baseboards

22. Heating System # 1 Specs:

- Manufacturer
- Model #:
- Manufacture Date:
- Estimated Age:
- Input Capacity (kW, kBtu):
- Output Capacity (kW, kBtu):
- Efficiency:

Secondary Heating System

23. Is there a secondary heating system in your home? o yes o no (if no, skip to next section)

24. Secondary heating system fuel type:

- Gas
- Fuel Oil
- Electricity
- Wood: cords per year _____
- Kerosene
- Solar
- Propane

25. Secondary heating system type:

- Baseboards
- Wall
- Heat pump w/ electric supplement
- Heat pump w/o electric supplement
- Forced Air Furnace
- Portable
- Hydronic System
- Floor
- Ceiling Cable
- Fireplace
- Window Unit Resistance
- Woodstove

26. Heating System # 2 Specs:

- Manufacturer
- Model #:

- Manufacture Date:
- Estimated Age:
- Input Capacity (kW, kBtu):
- Output Capacity (kW, kBtu):
- Efficiency:

Primary Cooling System

27. Do you have an air conditioning/cooling system for your home? [Do not include fans]?

- Yes No [Go to next section]

28. Typical summer AC use:

- Not at all
- Low (When needed)
- Moderate (Frequently)
- High (All the time)
- Usually gone in Summer

29. AC system type:

- Split System AC
- Packaged System AC
- Window/ Wall Room Air Conditioner
- Evaporative System
- Portable- Stand Alone
- Heat Pump
- PTAC
- PTHP

30. Cooling System # 1 Specs:

- Manufacturer
- Model #:
- Manufacture Date:
- Estimated Age:
- Capacity (kW, kBtu):
- Efficiency:

31. Do you have a second air conditioning/cooling system for your home? [Do not include fans]?

Yes

No [Go to next section]

32. Typical summer AC use:

- Not at all
- Low (When needed)
- Moderate (Frequently)
- High (All the time)
- Usually gone in Summer

33. Secondary AC system type:

- Split System AC
- Packaged System AC
- Window/ Wall Room Air Conditioner
- Evaporative System
- Portable- Stand Alone
- Heat Pump
- PTAC
- PTHP

34. Cooling System # 2 Specs:

- Manufacturer
- Model #:
- Manufacture Date:
- Estimated Age:
- Capacity (kW, kBtu):
- Efficiency:

Clothes Washer

35. Do you have a Clothes Washer?

- Yes
- No

36. Clothes washer use per week:

- 1 Load
- 2-4 Loads
- 5-9 Loads
- 10-14 Loads
- >15 Loads

37. Type of washer: Standard

Horizontal axis

38. Washing Machine Specs:

- Manufacturer:
- Model #:
- Manufacture Date:
- Estimated Age:

39. Do you have a second washing machine that you regularly use?

- Yes
- No

Clothes Dryer

40. Clothes Dryer

- Yes
- No

41. Use of dryer:

- Used for All Loads
- Used for Most Loads
- Infrequent Use
- Unknown

42. Fuel type: Electric Gas Propane Other

43. Dryer Specs:

- Manufacturer:
- Model #:
- Manufacture Date:
- Estimated Age:

Refrigerators:

44. Type of Primary Refrigerator:

- Standard
- Side by Side
- Built-in
- Top-Bottom Freezer

45. Primary Refrigerator Options:

- None
- Ice maker
- Through the door service

46. Refrigerator Volume:

- VERY SMALL (<=10 CUBIC FEET)
- SMALL (11-14 CUBIC FEET)
- MEDIUM (15-18 CUBIC FEET)
- LARGE (19-22 CUBIC FEET)
- VERY LARGE (>22 CUBIC FEET)

47. Primary Refrigerator Specs:

- Manufacturer:
- Model #:
- Manufacture Date:
- Estimated Age:

SAME INFO FOR SECONDARY AND THIRD REFRIGERATOR (IF APPLICABLE), ALSO INCLUDE THE FOLLOWING QUESTIONS FOR THESE UNITS.

48. Is this refrigerator plugged in year round?

- Yes
- No

49. If not plugged in year round, what percent of the time is it used?

- Fall _____%
- Spring _____%
- Winter _____%

- Summer ___%
- Not used

Other Kitchen Appliances:

50. Range Usage:

- >Once per Day
- 4-6 times per week
- <4 times per week

51. Range Specs:

- Fuel Type:
- Manufacturer:
- Model #:
- Manufacture Date:
- Estimated Age:

52. Microwave Usage:

- >Once per Day
- 4-6 times per week
- <4 times per week

53. Microwave Specs:

- Fuel Type:
- Manufacturer:
- Model #:
- Manufacture Date:
- Estimated Age:

54. Dishwasher Usage:

- >Once per Day
- 4-6 times per week
- <4 times per week

55. Dishwasher Specs:

- Fuel Type:
- Manufacturer:
- Model #:
- Manufacture Date:
- Estimated Age:

Freezer

56. Do you have a Freezer that is used?

- Yes
- No

57. Freezer Type:

- Upright
- Chest
- Other

58. Freezer Volume:

- VERY SMALL (<=10 CUBIC FEET)

- SMALL (11-14 CUBIC FEET)
- MEDIUM (15-18 CUBIC FEET)
- LARGE (19-22 CUBIC FEET)
- VERY LARGE (>22 CUBIC FEET)

59. Primary Freezer Specs:

- Manufacturer:
- Model #:
- Manufacture Date:
- Estimated Age:

60. Is this freezer plugged in year round?

- Yes
- No

61. If not plugged in year round, what percent of the time is it used?

- Fall _____%
- Spring _____%
- Winter _____%
- Summer _____%
- Not used

Water Heater

62. Water Heater Type?

- GAS STORAGE
- PROPANE STORAGE
- ELECTRIC STORAGE
- GAS INSTANTANEOUS
- ELECTRIC INSTANTANEOUS
- HEAT PUMP
- Solar
- Solar w/ Electric Storage
- Solar w/ Gas Storage
- Solar w/ Propane

63. Hot Water Heater Specifications

- Manufacturer:
- Model #:
- Tank Size:
- Input (kW or kBtu):
- Energy Factor:
- External Tank Wrap:
- Internal R-value:
- Manufacture Date:
- Estimated Age:

Spa/Pool

64. Do you have a hot tub?

- Yes
- No
- Yes, but no currently used

65. What fuel does your hot tub's hot water heater use?

- Electric
- Gas
- Propane
- Solar / Electric
- Solar / Gas
- Solar / Propane

66. Do you have a pool?

- Yes
- No
- Yes, but no currently used

67. What fuel does your pools heater use?

- Electric
- Gas
- Propane
- Other
- Solar Only
- Solar / Electric
- Solar / Gas
- Solar / Propane

Insulation (if customer has any contractor invoices regarding insulation, use these instead of visual inspection for the following)

68. Floor Construction? Crawlspace: ____% Concrete slab: ____% Basement ____% (must sum to 1)

69. Basement finished?

- Yes
- No
- Partial

70. Wall construction type:

- 2 x 4
- 2 x 6
- Masonry
- Not observable

71. What percentage of the exterior walls in the home are insulated?

- 0%
- 25%
- 50%
- 75%
- 100%
- Unknown

72. Estimate Wall Insulation R-Value:

- <R-11
- R-11
- R-13
- R-14
- R-15

- R-19
- Not observable
- None

73. Blown-in attic insulation (estimate number of inches): _____

74. Attic/Ceiling Batt insulation (estimate number of inches): _____

75. Attic/Ceiling Batt insulation R-Value:

- <R-11 R-28
- R-11 R-30
- R-13 R-36
- R-14 R-38
- R-15 R-49
- R-19 Not observable
- R-21 None
- R-22

76. Floor insulation?

- <R-11 Slab on grade
- R-11 Not observable
- R-13 None
- R-15
- R-19
- >R-19

Basement

77. Basement wall R-value

- <R-11
- R-11
- R-13
- R-15
- R-19
- >R-19
- None

78. Basement knee wall R-value

- <R-11
- R-11
- R-13
- R-15
- R-19
- R-21
- R-30
- Not observable
- None

Windows

79. What is the predominant window type in the home?

| | | | |
|-------------------|--------------|----------------------|--------------|
| Frame Type | Panes | Low E Coating | Storm |
|-------------------|--------------|----------------------|--------------|

| | | | |
|-------|--------|-----|-----|
| Metal | Single | Yes | Yes |
| Wood | Double | No | No |
| Vinyl | Triple | Unk | Unk |
| Other | | | |

80. Square footage by orientation (N, W, E, S)

| | North | West | East | South |
|------------------|-------|------|------|-------|
| Area (sf) | | | | |
| Shading Fraction | | | | |

Other major end uses:

- 81. Waterbed yes no
- 82. Aquarium yes no
- 83. Welding equipment yes no
- 84. Shop attached yes no
- 85. # of TVs
- 86. # of computers/workstations
- 87. #faxes
- 88. Solar PV yes no _____#watts
- 89. Other large gas or electric end uses? _____

| Field Heading | Value | Comments |
|-------------------------|---|----------|
| SiteID | RLW Site Identification Number | |
| Number of Fixtures | Total fixtures in house | |
| Archit_Integrated | Number of architecturally integrated fixtures | |
| Ceiling Fan | Number of ceiling fan fixtures | |
| Ceiling Fixtures | Number of ceiling fixtures | |
| Chandelier Hanging | Number of hanging chandelier | |
| Floor Lamp | Number of floor lamps | |
| Garage Door Opener | Number of garage door openers | |
| Other | Number of other fixtures | |
| Recessed can | Number of recessed can fixtures | |
| Recessed lighting Other | Number of recessed lighting other fixtures | |
| Table lamps | Number of table lamps | |
| Torchiere | Number of torchieres | |
| Track lighting | Number of track lighting fixtures | |
| Under Counter | Number of under counter fixtures | |
| Wall mount | Number of wall mount fixtures | |

All - Lamps Table

The All Lamps Table contains the number of lamps by lamp type per home.

| Field Heading | Value | Comments |
|---------------|--|----------|
| SiteID | RLW Site Identification Number | |
| Total Lamps | Total number of lamps in the house | |
| CF-I-A | Number of A-type compact fluorescent lamps with an integrated ballast | |
| CF-I-CAP | Number of capsule compact fluorescent lamps with an integrated ballast | |
| CF-I-CIRC | Number of circline-type compact fluorescent lamps with an integrated ballast | |
| CF-I-DEC | Number of decorative-type compact fluorescent lamps with an integrated ballast | |
| CF-I-FLOOD | Number of flood-type compact fluorescent lamps with an integrated ballast | |
| CF-I-GLO | Number of globe-type compact fluorescent lamps with an integrated ballast | |

| | | |
|-------------|---|--|
| CF-I-SPRN | Number of spring-type compact fluorescent lamps with an integrated ballast | |
| CF-I-TUBE | Number of tube-type compact fluorescent lamps with an integrated ballast | |
| CF-I-UNK | Number of unknown type compact fluorescent lamps with an integrated ballast | |
| CF-MINI | Number of miniature compact fluorescent lamps | |
| CF-PIN-BASE | Number of pin based compact fluorescent lamps with an integrated ballast | |
| F-12 | Number of F-12 fluorescent lamps | |
| F-4 | Number of F-4 fluorescent lamps | |
| F-5 | Number of F-5 fluorescent lamps | |
| F-8 | Number of F-8 fluorescent lamps | |
| F-CIR | Number of circline fluorescent lamps | |
| F-OTH | Number of other fluorescent lamps | |
| F-TUBE-UNK | Number of unknown fluorescent lamps | |
| HAL-MR | Number of halogen MR lamps | |
| HAL-OTH | Number of other halogen lamps | |
| HAL-PAR | Number of halogen PAR lamps | |
| HAL-QTZTUB | Number of halogen quartz tube lamps | |
| HAL-UNK | Number of unknown halogen lamps | |
| HEAT LAMP | Number of heat lamps | |
| I-DEC | Number of incandescent decorative lamps | |
| I-FLOOD | Number of incandescent flood lamps | |
| I-GLO | Number of incandescent globe lamps | |
| I-MINI | Number of incandescent mini lamps | |
| I-OTH | Number of other incandescent lamps | |
| I-STD | Number of incandescent standard A-type lamps | |
| I-UNK | Number of unknown incandescent lamps | |

Control and Wattage All Table

The Control and Wattage All table contains the inventory of fixture type and quantity, lamp type, wattage, and quantity, and control type in each room of the home.

| Field Heading | Value | Comments |
|---------------|--------------------------------------|----------|
| SiteID | RLW Site Identification Number | |
| Room | Room type | |
| FixType | Type of light fixture | |
| FixQTY | Number of each fixture | |
| LampType | Lamp technology installed in fixture | |
| LampQTY | Number of lamps per fixture | |

| | | |
|----------------|--|--|
| LampWATTS | Wattage of lamps in fixture | |
| Total Lamp Qty | Number of similar lamps in similar fixtures | |
| LControl | Switch, timer, dimmer, motion, photo | |
| Fixture Number | Unique number identifier generated for fixture | |

Rooms – Fixtures Table

The Rooms - Fixtures table provides, for each room type including the whole house, the total number of fixtures as well as indicator variables indicating whether the site had a particular fixture type and lamp type combination.

| Field Heading | Value | Comments |
|-------------------------|--|----------|
| SiteID | RLW Site Identification Number | |
| Room | Room Type | |
| Number of Fixtures | Total Number of Fixtures | |
| Archit_ Integrated | Count of Architecturally Integrated Fixtures | |
| Ceiling Fan | Count of Ceiling Fan Fixtures | |
| Ceiling fixtures | Count of Ceiling Mounted Fixtures | |
| Chandelier Hanging | Count of Chandelier/Hanging Fixtures | |
| Floor Lamp | Count of Floor Lamps | |
| Garage Door Opener | Count of garage door openers | |
| Other | Count of other fixtures | |
| Recessed can | Count of recessed can fixtures | |
| Recessed lighting Other | Count of recessed lighting other fixtures | |
| Table lamps | Count of table lamps | |
| Torchiere | Count of torchieres | |
| Track lighting | Count of track lighting fixtures | |
| Under Counter | Count of under counter fixtures | |
| Wall mount | Count of wall mount fixtures | |

Rooms – Lamp Presence Table

The Rooms – Lamp Presence Table provides, for each room type the type of lamps present.

| Field Heading | Value | Comments |
|------------------------|--|----------|
| SiteID | RLW Site Identification Number | |
| ROOM | Room Type | |
| Total Lamps | Total Number of Lamps | |
| CF-Compact Fluorescent | Compact fluorescent lamps with an integrated ballast | |

| | | |
|-------------------|--------------------------|--|
| F-Fluorescent | Linear fluorescent lamps | |
| HAL-Halogen | halogen lamps | |
| Inc- Incandescent | All incandescent lamps | |

General Information Table

| Field Heading | Value | Comments |
|--------------------------------------|---|-------------------|
| SiteID | RLW Site Identification Number | |
| Type of Residence | Single Family Home, Apartment, etc. | |
| Total People | Total Number of Residents at Site | |
| Total Adults | Total Number of Adults at Site | |
| People | | |
| Adults | | |
| People Under 1 year | Total Number of People Under 1 Year at Site | |
| People 2 to 5 years | Total Number of People between 2 to 5 years at site | |
| People 6 to 18 years | Total Number of People between 6 to 18 years at site | |
| People 18 to 29 years | Total Number of People between 18 to 29 years at site | |
| People 30 to 49 years | Total Number of People between 30 to 49 years at site | |
| People 50 to 64 years | Total Number of People between 50 to 64 years at site | |
| People 65 or more years | Total Number of People over 65 years at site | |
| Income | Annual Household Income Range | Resident Supplied |
| Total Heated Sqft | Square Footage Range of Residence | |
| Age Range | Age Range of Residence | |
| Rent or Own | Ownership Status of Residence | |
| Who Pays Electric? (Occ or Landlord) | Responsibility for Electric Bill | |
| Who Pays Gas? | Responsibility for Gas Bill | |
| Total Heated Floorspace | Square Footage of Heated Floorspace of Residence | |

Single Family Appliance Data Tables

Definitions

Primary and Secondary Refrigerators Tables

| Field Heading | Value | Comments |
|------------------------|--|----------|
| SITE ID | RLW Site Identification Number | |
| Refrigerator | Primary or secondary and use | |
| FridgeType | Standard, side by side, freezer on bottom, single door | |
| YearsOld | Age of refrigerator in years | |
| Through Door Dispenser | Icemaker, water and ice service in door, none | |
| SizeRange | Small, medium, large, very large | |
| MFG | Name of manufacturer | |
| ModelNo | Model number | |
| MFGdate | Date of manufacture | |
| AEC | Model number parsed for matching | |
| MModel | Model number parsed for matching | |
| Match | Matching model number found in efficiency database? | |

Clothes Dryer Table

| Field Heading | Value | Comments |
|------------------|---------------------------------------|-----------------------------------|
| SiteID | RLW Site Identification Number | |
| Dryer Number | 1=primary, 2=secondary | Code for primary, secondary dryer |
| Usage | Infrequent use, most loads, all loads | |
| Age of Machine | Resident reported age from on-site | |
| Fuel Type | Natural Gas, Propane, or Electric | |
| Manufacturer | Manufacturer from on-site | |
| Model Number | Model number from on-site | |
| Manufacture Date | Manufacture Date from matching | |
| Moisture Sensor | Does the unit have moisture sensing | |
| Energy Factor | Energy Factor from matching | |

Cooling System Table

| | | |
|------------------|--|---------------------------|
| SiteID | RLW Site Identification Number | |
| Cooling Unit # | Cooling system ID number | Cooling unit #1=primary |
| Cooling System | Cooling System present? | Y-Yes, N=No |
| Space or Central | Space or Central System Classification | |
| Tons Estimate | Estimated tonnage of cooling system | |
| ACUsage | Customer reported usage of AC | High, Moderate, Low, None |
| System Type | System type (e.g.. split system, win/wall, package, etc.) | |
| SysCap | Capacity of cooling system | |
| Manufacturer | Manufacturer of system, from on-site | |
| Model Number | Model number of system from on-site | |
| Age of System | Customer reported age of system in years old, from on-site | |
| Manufacture Date | Date of manufacture from efficiency database | |
| SEER | Matched Efficiency | |
| PriSec | -1 if primary, 0 if secondary | |
| EER | Matched Efficiency | |

Dishwasher Table

| Field Heading | Value | Comments |
|----------------------------------|---|--------------------------|
| SiteID | RLW Site Identification Number | |
| Dishwasher Number | Code for primary or secondary dishwasher | |
| Age of Dishwasher (in years old) | Age from model number match | |
| Manufacturer | Manufacturer from on-site | |
| Manufacturer Date | Date of manufacture | |
| Model Number | Model number from onsite | |
| Model_Clean | Model Number with non alphanumerics removed | |
| Energy Factor | Energy Factor | [load/kWh]-from database |

| | | |
|--------|---------------------|---------------------------------|
| Source | CEC_ckwa if matched | CEC_ckwa was only database used |
|--------|---------------------|---------------------------------|

Envelope Table

| Field Heading | Value | Comments |
|----------------------------|------------------------------------|----------|
| SiteID | RLW Site Identification Number | |
| Wall Construction Type | Exterior wall construction type | |
| Wall Insulation R-Value | R-Value of Walls | |
| Attic R-Value | Batt Insulation (R-Value) | |
| Floor Insulation (R-Value) | Floor Insulation (R-Value) | |
| Frame Type | Predominant Window Frame Type | |
| Number of Panes | Average Number of Panes per Window | |
| LowE | Low-e coating on windows | |
| Storm | Storm windows | |
| CrawlVenting | Is the crawl space vented | |
| Basement | Does the home have a basement | |

General Information Table

| Field Heading | Value | Comments |
|----------------------|--|-------------------------------|
| SiteID | RLW Site Identification Number | |
| Weight | Case weight used for all saturation analyses | |
| Type of Residence | Single Family Home, Apartment, etc. | |
| Total People | Total Number of Residents at Site | |
| Total Adults | Total Number of Adults at Site | 18 and over |
| People | Total Number of Residents at Site | Converted from text to number |
| Adults | Total Number of Adults at Site | Converted from text to number |
| People Under 1 year | Total Number of People Under 1 Year at Site | |
| People 2 to 5 years | Total Number of People between 2 to 5 years at site | |
| People 6 to 18 years | Total Number of People between 6 to 18 years at site | |

| | | |
|--------------------------------------|---|-------------------|
| People 18 to 29 years | Total Number of People between 18 to 29 years at site | |
| People 30 to 49 years | Total Number of People between 30 to 49 years at site | |
| People 50 to 64 years | Total Number of People between 50 to 64 years at site | |
| People 65 or more years | Total Number of People over 65 years at site | |
| Income | Annual Household Income Range | Resident Supplied |
| Total Heated Sqft | Square Footage Range of Residence | |
| Age Range | Age Range of Residence | |
| Rent or Own | Ownership Status of Residence | |
| Who Pays Electric? (Occ or Landlord) | Responsibility for Electric Bill | |
| Who Pays Gas? | Responsibility for Gas Bill | |
| Total Heated Floorspace | Square Footage of Heated Floorspace of Residence | |

Heating System

| | | |
|------------------|--|-----------------------|
| SiteID | RLW Site Identification Number | |
| Furnace # | Furnace ID number | Furnace #_1 = Primary |
| Space or Central | Space or Central System Type | |
| Fuel Type | Fuel type of system (i.e. electric, gas wood, etc.) | |
| System Type | System type (i.e. forced air furnace, baseboard, wall, etc.) | |
| Age of System | Customer reported age of system in years old. | From on-site |
| Manufacturer | On-site name of furnace manufacturer | From nameplate |
| Model Number | On-site model number | From nameplate |
| Model_Clean | Model number with all alphanumeric symbols removed | |
| Input | CEC_cent input capacity (kBtuh) | |
| Output | CEC_cent output capacity (kBtuh) | |
| Afue1 | Annual Fuel Utilization Efficiency for unit if | |

| | | |
|------------------|-------------------------|--|
| | matched | |
| Manufacture Date | Date of manufacture | |
| HP_HSPF | Efficiency of heat pump | |
| HP_Output | Output of heat pump | |

Swimming Pool Table

| Field Heading | Value | Comments |
|---------------|--------------------------------|----------|
| SiteID | RLW Site Identification Number | |
| Heated | Is pool heated | |
| FuelTyp | Fuel type for heater | |

Washing Machine Table

| Field Heading | Value | Comments |
|-------------------------------|--|--|
| SiteID | RLW Site Identification Number | |
| Washing Machine # | | |
| Type of Washer | Standard or Horizontal Axis | |
| Age of Machine (in years old) | Age from model number match | |
| Age of Machine | Resident reported age | |
| Manufacturer | Manufacturer from on-site | |
| Model Number | Model Number as recorded from On-site | |
| Model_Clean | Model Number with non alphanumeric removed | Used for model number to database matching |
| Type | Numeric Code for Washer Type | |
| Energy Factor | Energy Factor [cubic feet/kWh] | |
| Water Factor | Gallon capacity over cubic feet | Not Used |
| Moisture Content | Remaining water content from CEC_ckwa.dbf database | Not Used |
| Source | Database from which washer data was extracted | |
| Age estimate | Resident reported age from on-site | |

Spa

| Field Heading | Value | Comments |
|---------------|--------------------------------|----------|
| SiteID | RLW Site Identification Number | |
| FuelTyp | Fuel type for heater | |

Water Heater Table

| Field Heading | Value | Comments |
|------------------------------------|--|---|
| SiteID | RLW Site Identification Number | |
| Water Heater # | 1=primary, 2=secondary | |
| Fuel Type | Gas or Electric | From on-site |
| Fuel Type_On_Site | Gas, Heat Pump, No Heat Pump | To determine if Electric water heater users have heat pump or not |
| on-site energy factor | Energy Factor from nameplate | |
| Size (gallons) | Storage capacity in Gallons | From on-site |
| Heater Type | Storage or Instantaneous | |
| Internal Tank Insulation (R-Value) | R-Value of Internal Tank insulation from on-site | |
| External Tank Wrap? | Yes -external tank wrap, No wrap | |
| Age (in years old) | Estimated Age of Water heater in years old | Resident Reported |
| If Electric-KW | Capacity in kW if Electric | |
| If Gas-kBtuh | Capacity in kBtuh if gas | |
| Manufacturer | Manufacturer from on-site | |
| Model Number | Model number from on-site | |
| Model_Clean | Model number with non-alphanumerics removed | Used for database matching |
| Fuel | Electric, Gas | Gas is natural gas or propane |
| Gallons | Storage capacity in gallons from database match | |

| | | |
|---------------------------|---|--|
| Gallons Estimate | Storage capacity in gallons from on-site | |
| Instant | Yes=Instantaneous, No=Storage | Only one instantaneous heater found |
| Input | Input Capacity Btu orkW from database match | |
| Efficiency | Efficiency of water heater from database match | No cycling, and transmission losses considered |
| Annual Energy Consumption | Annual Energy consumption from database matching | Btu for Gas, kWh for electric |
| Energy Factor | Energy Factor from database matching | Energy Factor for water heater is unit less, (water heater delivered energy/energy consumed) |
| Source | CEC_gwh for matched gas heaters, CEC_ewh for matched electric water heaters | |
| Age Estimate | Estimated Manufacture Date from on-site | (2000-Age in years old) |

Tables 1d-9d contain the adjusted case weights that were applied to the efficiency analyses to take into account the match rates of appliances by age group.