Residential Single Family

Quality Assurance Policies and Procedures

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Quality Overview

As a public benefit corporation, NYSERDA strives to deliver the most effective residential energy efficiency Programs possible and to protect rate payer money. To achieve these goals, the Residential programs contain a quality component at no cost to the consumer. The Quality process is used to verify that projects in the Program meet all requirements while maintaining healthy and safe living conditions for the occupants and serves as a learning and teaching tool supporting the application of sound building science principles and the delivery of highest quality services to the homeowners of New York State.

Quality Compliance

Quality Assurance Inspections by 3rd Party

Quality Assurance (QA) post-completion field inspections are performed by an independent third-party to verify compliance with program requirements, building performance standards, customer satisfaction and to ensure homes are left in a healthy and safe condition. Deficiencies identified during the field inspection may be required by NYSERDA to be corrected with all remediation activity documented via the corrective action resolution process.

No cost to Homeowner (standard)

To maintain high standards of performance, NYSERDA randomly selects recently completed projects for post-completion field inspection at no cost to the homeowner. Homeowners may also request inspections at any time. These inspections are performed by an independent building science expert paid by NYSERDA. Participating contractors are encouraged to be present to receive feedback firsthand.

Sampling Protocol

Projects completed through the Program are subject to post-completion field inspection by NYSERDA or its Quality designee. Although projects selected for inspection generally occur within 30 days and generally not more than 90 days from the date of completion, NYSERDA reserves the right to inspect projects at any time should specific concerns be brought to our attention. The QA Contractor shall not regularly schedule QA Field inspections later than ninety (90) days from project completion unless in response to special circumstances.

Market Rate:

It is anticipated that quality field inspections will be provided to 15% of completed market rate projects on average across the program. A rational sampling approach allows Contractors with high quality scores and who prove to have well defined and effective internal quality assurance and quality control practices to benefit from a lower inspection rate. The Program average inspection rate will not be reduced to less than 5%.

Low and Moderate Income (LMI):

It is anticipated that quality inspections will be provided at a 15% inspection rate for Low Income home performance services and moderate-income home performance services, and a 10% inspection rate for low-income, electric reduction only services. Contractors with high quality scores and who prove to have well defined and effective internal quality assurance and quality control practices may benefit from a lower inspection rate. The Program average inspection rate will not be reduced to less than 5%.

Targeted Inspection Rate by Production Volume and Performance

The targeted rational sampling approach is based on the overall quality performance using the 1 to 5 scoring method, where 3 is the minimum quality requirement versus the average annual production volume of the Participating Contractor. An example of this sampling approach is presented below.

NYSERDA will determine the specific sampling rate and provide notice to the Quality Services Provider as necessary to achieve desired Program objectives. The sampling rates may be specified uniquely for whole-house "Home Performance" projects versus Electric Reduction (ER-Only) projects such as in the example outlined below.

ER-Only Projects

- Large Production/Good Performance = 2%
- Large Production/Bad Performance or high variation = 5%
- Medium Production/Good Performance = 10%
- Medium Production/Bad Performance w/high variation or negative correlation coefficient = 30%
- Small Production/Good Performance = 10%
- Small Production/Bad Performance = 30-100%

Low Income and Moderate Income Home Performance Services

- Large Production/Good Performance = 2%
- Large Production/Bad Performance w/high variation or negative correlation coefficient = 15%
- Medium Production/Good Performance = 15%
- Medium Production/Bad Performance = 30%
- Small Production/Good Performance = 15%
- Small Production/Bad Performance = 30-100%

Table 1: Inspection Rate by Production Volume and Performance

*Annual Production Volume**	*Average Quality Score*		
	< 3	*= 3*	*4 - 5*
Large (More than 300)	Average 5% (up to 15%)	Average 5% (5-15%)	Average 2% (1-5%)
Medium (100 to 300)	Average 30% Up to 100%	Average 12.5% (10-15%)	Average 2% (1-5%)
Small (Less than 100)	Average 30% Up to 100%	Average 12.5% (10-15%)	Average 12.5% (10-15%)

*Production volume definitions subject to change at the discretion of NYSERDA

Target Inspection Rate by Status

Below are the established sampling protocols based on the Participating Contractor's participation status or upon special request from NYSERDA or the homeowner.

Provisional Status:

Newly Participating Contractors are designated as 'Provisional' status and must complete a minimum of three projects meeting the minimum standard Quality requirements. These Quality requirements must be met by the sixth inspected project or within a period of one year from the date of completion of the first completed project, whichever comes first. Provisional contractors are strongly encouraged to attend at least the first three (3) field inspections as it provides an opportunity to learn first-hand the Program quality expectations and field inspection process.

Full Status:

The target inspection rate for Full status contractors is 15% of completed projects, with a minimum of one (1) inspection per quarter. NYSERDA reserves the right to adjust the field inspection rate based on the individual performance of each contractor.

Special Status Request:

Projects may be selected for inspection at the request of program customers (home owners) or NYSERDA within one year of signing the Project Incentives and Financing Eligibility Summary Report. All field inspections conducted beyond 90 days from signing this form will not be scored and will be limited to specific concerns, and may include, but not be limited to: (a) health and safety testing such as gas leaks, combustion appliance drafting, and CO measurement, (b) verifying that the contracted energy conservation measures are installed, (c) verifying that the measures on the contract are present and have been installed correctly.

Probationary Status:

Up to 100% of projects completed while on Probationary status may be subject to field inspections, at the sole discretion of NYSERDA. Inspection findings will be used by the Program Technical Services team as one of many factors in determining a contractor's future participation status.

Suspended Status:

Up to 100% of projects completed while on a Suspended status may be subject to field inspections, at the sole discretion of NYSERDA. Inspection findings will be used by the Program Technical Services team as one of many factors in determining a contractor's future participation status.

Terminated Status:

Depending on the circumstances of termination, NYSERDA may at its sole discretion, conduct field inspections on a percentage of projects as deemed appropriate.

Scheduling Field Inspections

Setting up the Customer Call List

The Quality Services Provider is responsible for scheduling field inspections of completed projects within the assigned region(s) using the QACSS. The Quality Services Provider shall strive to conduct field inspections within thirty (30) days of project completion and to meet the specified average Program inspection percentage rate, and rational sampling plan for individual contractors as stipulated by NYSERDA. The QA Contractor shall not regularly schedule Field Inspections later than ninety (90) days from project completion unless in response to special circumstances.

Obtain Project Data Prior to Conducting Field Inspections

Once sites are selected and inspections are scheduled using the QACSS, the Scheduler shall obtain the complete project file from the Program Portal and upload required information to the QACSS to support the retrieval, review and field use of project files by the Field Inspectors.

Contractor Invitation to Field Inspection

Customers contacted by NYSERDA's Quality Service Provider to schedule a field inspection will have the option of allowing the Participating Contractor to be present at the time of inspection.

Customers are encouraged to allow the Participating Contractor to attend so that any questions can be answered, and minor fixes may be made on site. If the customer agrees, the Participating Contractor shall be notified of the upcoming inspection via email and shall RSVP via the QACSS Portal. Inspections shall be scheduled at least two weeks in advance and no less than Five (5) business days.

Customers have the right to request that the Participating Contractor not attend the field inspection. In these situations, the Participating Contractor will not be notified of the scheduled inspection but will receive the result of the inspection within five (5) business days after inspection.

Field Inspection Procedures

Field inspection procedures are generally outlined below and are used to assess the performance of participating contractors and their level of compliance with technical standards and programmatic rules. To view a detailed list of all field inspection check points, please refer to the ***Residential Single Family Field Inspection Checklist***.

Field Inspection Types

There are three "Inspection Types" outlined by Project Type and Market Sector in Table 2 below. The Inspection Type, "Field Inspection: Comprehensive" includes all elements described in the "On-site Field Inspection Protocol" below, whereas the Inspection Type, "Field Inspection: Electric Reduction" includes only those elements required for low-income projects.

Table 2: Inspection Type by Project and Market Sector

Project Type	*Market Sector*	*Inspection Type*
Comprehensive or Single Measure requiring blower door testing	LMI and Market	Field Inspection: Comprehensive
Electric Reduction Measures	LMI	Field Inspection: Electric Reduction
Special requests by NYSERDA	LMI and Market	Non-Standard Inspection

Preparation for Field Inspection and Homeowner Orientation

The Quality Services Provider's Field Inspector shall conduct one of three inspection types based on the Project Type and Market Sector as outlined in Table 2 above. Each inspection type requires the following:

- An introduction to the customer, including the QA Field Inspector's name and company;
- A description of the inspection and testing procedures;
- An overview of the Residential Program and answers to customer questions; and
- Ask customer questions about any identified project concerns after having reviewed project documentation.
- Determine whether health and safety issues were identified by the Participating Contractor audit and assess whether the approved Participating Contractor work scope addressed those issues.
- Determine whether the most cost-effective energy efficiency measures were recommended by the Contractor, whether the approved and contracted measures were installed and whether the installed measures meet Program standards.

RES SF (1-4 units) Field Inspection: Comprehensive (Whole House)

Application: LMI and Market Rate Comprehensive Whole House projects

- Complete exterior visual inspection (i.e., chimneys, ventilation, roofing, siding, windows, foundation, obstructions, and landscaping);
- Complete interior inspection (*i.e.*, visual inspection, place home under winter conditions, test CO levels, and set up blower door);
- Complete basement inspection (i.e., visual inspections of condition, insulation levels and distribution system, measure CO in combustion appliance zone [CAZ], gas leak detection, combustion efficiency testing, and worst-case depressurization);
- Complete attic inspection;
- Conduct blower door test;
- Complete building shell inspection with thermal imaging infrared scan required for all times when temperature delta allows for good imaging results (i.e. insulation levels in walls, attics, floors, windows, and doors);
- Verify wall insulation installation using a combination of the following:
  - Probing outlets or drilling holes (required on all projects);
  - Pulling and checking under siding;
  - Borescope
  - Infrared scans (conditions permitting); and
  - Core sampling to verify density as directed by NYSERDA.
- Appliance and lighting inspections to determine if the recommended measures were the most cost-effective; and
- Ensure all approved energy conservation measures are installed, operating, and in compliance with building efficiency standards and Program requirements.

RES SF (1-4 units) Field Inspection: Comprehensive (Single Measure w/Blower Door)

Application: LMI and Market Rate Single-measure projects with Air Sealing and Insulation

- Ensure approved energy efficiency measure(s) were installed, functioning properly, and in compliance with technical/manufacturer standards, applicable BPI building science standards and Program requirements;
- Conduct blower door test and inspect for air leakage in the structure;

- Complete building shell inspection with thermal imaging infrared scan required at all times when temperature delta allows for good imaging results (i.e. insulation levels in walls, attics, floors, windows, and doors);
- Verify wall insulation installation using a combination of the following:
  - Probing outlets or drilling holes (required on all projects);
  - Pulling and checking under siding;
  - Infrared scans (conditions permitting); and
  - Core sampling to verify density as directed by NYSERDA.

RES SF (1-4 units) Field Inspection: Electric Reduction

Application: LMI Electric Reduction projects

- Appliance and lighting inspections to determine if the recommended measures were the most cost-effective; and
- Determine whether all energy efficiency and conservation measures approved by the Program were installed, that they operate properly and in compliance with technical/manufacturer standards, applicable BPI building science standards and Program requirements.

RES SF (1-4 units) Desk Review: Measure Verification (Non-standard Inspection)

Application: LMI and Market Rate projects

- Participating Contractor will provide equipment technical data sheet and nameplate photo for the installed energy conservation measure (e.g. appliance, heating equipment, water heater, etc.).
- Desk Reviewer will verify installation with the customer, including total cost and homeowner cost-share;
- Complete a customer survey through QACSS during verification contact with customer.

RES SF QACSS Scoring System

QACSS Scoring Algorithm

Each field inspection will receive a score from 1 to 5, using a five point scoring system, where a score of three (3) represents the minimum quality requirements for the Program.

Overall QA Inspection Scoring Criteria

Each inspection will receive a score, on a five point scale. This score is an indicator of the overall quality and compliance with Program requirements, based on the number and type of non-conformances observed. Specific criteria are given in Table 3, for scores of one (1), three (3), and five (5).

Table 3: QA Inspection Scoring Criteria

Defect Category	*Number of Defects by Defect Category (Effect on QA Score)*		
	Score of 5	*Score of 3*	*Score of 1*
Incidental	Up to 3	Allowed	Allowed
Minor	0	Up to 3	Allowed
Major	0	0	2 or more
Critical	0	0	1 or more

In calculating the score, the highest level of observed non-conformance is the most important factor. For example, projects with two (2) major non-conformances would receive a score of one (1), even if it had no minor or incidental non-conformances. Projects with any critical non-conformance will automatically receive a score of one (1). A project with four (4) minor non-conformances, and no others, would receive a score of two (2), and if there are additionally incidental non-conformances, would receive a score of one (1). Similarly, a project with only one (1) or two (2) minor non-conformances would receive a score of four (4), since it does not quite meet the requirements to get a five (5) but exceeds the thresholds to achieve a score of three (3). The final score, however, will be informed by the field inspector, who will have the latitude, if necessary, to recommend a higher or lower score, based on a holistic view of the project.

Score of 5: Project Meets All Program Criteria

A project receiving a score of five (5) is generally well-installed, with no noticeable defects in assessment quality, work quality, health & safety and overall Program compliance. These projects are examples of best practices in RES SF installation.

Score of 3: Project Meets Key Program Requirements

A project achieving a score of three (3) meets basic program requirements but may require some modification to be considered fully compliant.

Score of 1: Project Does Not Meet Program Requirements

Projects receiving a score of one (1) have failed to meet key Program requirements and are not expected to safely deliver mmBTU and carbon benefits aligned with the statement of work and Program records. These projects may require urgent attention to address safety concerns.

Field Data Collection

Assessment Quality

The Assessment Quality component covers the quality of the contractor's submitted assessment documentation in comparison to the on-site conditions verified by the Quality Inspector, summarized in the following table. This includes general data collection about the home, measurements, existing conditions and recommendations.

Table 4: Assessment Quality

Rating	*Description*
Pass	Conditions were recorded, measurements were performed, and recommendations were made correctly.
Conditional Pass	Conditions were recorded, measurements performed, and recommendations were made but minor issues were found that should be communicated to the contractor.
Fail	Conditions were recorded, measurements performed, and recommendations were made poorly or not at all.
Not Inspected	Conditions, measurement or recommendations could not be inspected due to site conditions and therefore is not included in point calculations.
Not Applicable	Conditions, measurement or recommendation was not applicable to the site, and therefore is not included in the point calculations.

Work Quality

The Work Quality component represents the largest portion of a project score as it is paramount to achieving predicted energy savings, has a large impact on customer satisfaction and is integral to a positive evaluation of the overall program. Each Energy Efficiency Measure (EEM) installed by a contractor has a grouping of required tasks to properly install the EEM. The quality of work is established through a field inspection to evaluate installed measures against a set of clearly defined tasks.

Table 5: Work Quality Ratings	
Rating	*Description*
Pass	Work was performed correctly.
Conditional Pass	Work was performed but minor issues were found that should be communicated to the contractor.
*Fail	Work was performed poorly or was not performed. Return visit or billing adjustment will almost always be required. *Note: Measures corrected by the Participating Contractor during the inspection will be documented and assessed at the condition first found by the Quality Inspector.
Not Inspected	Work that could not be inspected due to site conditions and therefore is not included in point calculations.
Not Applicable	This task was not applicable to the site, and therefore is not included in the point calculations.

Some tasks have been identified as being critical to the successful completion of that measure. When one of these tasks is rated as fail, it will result in a significant reduction in the scoring.

Health and Safety

The Health & Safety Quality component covers the quality of the contractor's submitted Health & Safety (H&S) documentation in comparison to the on-site conditions verified by the Quality Inspector. This includes an assessment of the combustion appliance safety testing data and a visual inspection of the home to determine potential H&S conditions were treated properly. A full list of the inspection points is included in the Field Inspection Checklist.

Table 6: Health & Safety Quality Ratings	
Rating	*Description*
Pass	Combustion Safety testing results are within Program and BPI testing limits and all potential H&S hazards were properly addressed.
Conditional Pass	Combustion Safety testing results indicates a recommendation to service an appliance should have been made but no recommendation was made.
*Fail	Combustion Safety testing results are outside of Program or BPI testing limits and one or more H&S hazards were not properly addressed. *Note: Measures corrected by the Participating Contractor during the inspection will be documented and assessed at the condition first found by the Quality Inspector.
Not Inspected	Work that could not be inspected due to site conditions and therefore is not included in point calculations.
Not Applicable	This task was not applicable to the site, and therefore is not included in the point calculations.

Handling Non-Conformance and Corrective Action

Projects that have non-conformances related to critical (Health & Safety) or major (Project Performance) attributes will automatically fail. Projects that have only non-conformances to minor or incidental attributes may pass or fail based upon their overall merit.

All non-conformances are expected to be addressed and corrected with regard to future work conducted in the Program. Acknowledgement and plans for preventing future problems may be requested by NYSERDA.

While some non-conformances cannot be corrected post installation, others can be remedied through corrective action to the documentation, incentive applied to the project or remediation of the project or certain energy conservation measures that have not met Program requirements.

When corrective action is required by NYSERDA, it will be indicated as such on the Inspection Report issued via email from the QACSS to the Participating Contractor. Failed Inspection Reports must be remediated within 30 days or disputed within 15 days of the issue date.

Sufficient evidence of the remediation must be provided to NYSERDA to document the completion of the required corrective action and resolution approved by NYSERDA within 30 calendar days. NYSERDA may at its option conduct a field verification of the remediated installation.

NYSERDA retains the right to provide a copy of the Inspection Report or specific information from the field inspection directly to the homeowner, all authorities having local jurisdiction or other stakeholder based upon health, safety and compliance concerns.

NYSERDA may, at NYSERDA's discretion, communicate by voice and/or written format with any customer (homeowner) with respect to any matter relevant to a proposed or installed project. Such communications may be in reply to an inquiry from a customer or at NYSERDA's initiation.

Reporting

Inspection Report

The Inspection Report all non-conformances that were identified during the field inspection along with the overall project score and whether this result passes or fails Program requirements.

Corrective Action Report

The Corrective Action Report (CAR) lists all non-conformances where NYSERDA requires remediation and response from the Participating Contractor. Requirements as to whether photo evidence of the completed correction are stipulated in the CAR.

Performance Reports

Each Participating Contractor shall have the ability to access all field inspection results through the QACSS as well as having access to the following formatted reports.

QA Performance Summary Report:

This report includes the total number of projects completed in the previous month, quarter and 12 months; the total number of field inspections during the previous month, quarter and 12 months; and the average quality score, and component scores for Assessment Quality, Work Quality, and Health & Safety Quality for the previous 12 months.

QA Scheduling Report:

This report includes a count of completed projects, inspections, contractor attendance at inspections, and the number of customers who refused an inspection.

QA Detail Report:

This report includes a list of all completed field inspections over designated period and the respective score, and summary of all measure/task deficiencies.

Pareto Analysis:

This statistical technique to guide decision-making quantifies the findings of a specific deficiency divided by the cumulative sum of all deficiencies found during field inspections over a defined period. The cumulative percent of each deficiency is tabulated to prioritize corrective action such that the priority reflects the deficiency with the greatest cumulative impact. It's based on the Pareto Principle (also known as the 80/20 Rule), the idea that 80 percent of problems may be caused by as few as 20 percent of causes.

Defect Frequency Analysis:

This statistical technique to guide decision-making quantifies the count of a specific deficiency divided by the sum of occurrence where the measure was included in the statement of work over a defined period. The relative percentage of times a defect is found as function of time a measure is implemented is tabulated to prioritize corrective action within certain measure categories which often relate to specific crew assignments.