ENERGY PERFORMANCE PROTOCOL

QUALITY ASSURANCE SPECIFICATION

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1.0   INVESTOR CONFIDENCE PROJECT

The Investor Confidence Project (ICP) provides a framework for energy efficiency project development, which standardizes projects into verifiable project classes in order to reduce transaction costs associated with technical underwriting and increase reliability and consistency of energy savings. The ICP Energy Performance Protocols and ICP Credentialing System provide a comprehensive framework of elements that is flexible enough to accommodate the wide range of methods and resources required by projects.

1.1   ENERGY EFFICIENCY PERFORMANCE – QUALITY ASSURANCE SPECIFICATION

This ICP Quality Assurance (QA) Specification represents a comprehensive resource designed for quality assurance providers, investors, and project developers to ensure that projects are developed in full compliance with the ICP Energy Performance Protocols. This document provides essential information regarding the Quality Assurance Provider's responsibilities and qualifications. It also covers the ICP QA process and how it integrates with the development of Investor Ready Energy Efficiency^{TM} Projects.

The ICP QA process can be applied either through a central authority such as a public program, by distributed third parties such as a qualified independent engineering firm, or by an individual. Projects that successfully comply with the ICP protocols and the Project Development and Quality Assurance Specifications are eligible to be certified by an ICP Credentialed Quality Assurance Provider as an ICP Investor Ready Energy Efficiency^{TM} project. This certification ensures that a project conforms to the ICP Energy Performance Protocols and standardized documentation requirements which assures investors that a project has been engineered to consistent industry best practices.

This specification presents the QA process as described by ICP and addresses the primary responsibilities of the QA Provider, which include:

- Ensuring that the project was developed in accordance with the most appropriate ICP Energy Performance Protocol as specified by the ICP Project Development Specification.
- Validating that all necessary documentation is provided and complete.
- Checking that methodologies, assumptions, and results follow best practices and are reasonable based on the reviewer's professional experience, available guidelines, or data-driven thresholds.
- Completing the ICP QA Checklist which lists all the required elements for ICP compliance. A signature provided by an ICP Credentialed Quality Assurance Provider certifies that the project is ICP compliant and satisfies the requirements of an ICP Investor Ready Energy Efficiency^{TM} project.

This document will evolve over time. ICP invites engineers, building owners, software developers, prospective lenders, investors, technical reviewers and other stakeholders to assist in improving these specifications by providing feedback gained during implementation of projects, participating in ICP technical forums, reviewing ICP documents, and sharing relevant resources.

1.2   USING THIS SPECIFICATION

This Quality Assurance Specification should be employed to understand and support the QA review process that is required for the certification of Investor Ready Energy Efficiency™ projects. The ICP Checklists are also a key part of the process and are intended to be used to check the completeness of the documentation package, to ensure that all components of the energy efficiency project have been documented, and to verify that the investment package is complete. The QA process should be tailored to each project to review the methodologies, assumptions and results based on the best practices defined in the ICP QA specification and specific QA tasks specified in the Project Development Specification.

2.0   PROJECT DEVELOPMENT AND QUALITY ASSURANCE

Energy efficiency investors, which can include building owners, energy service companies, finance firms, insurance providers, and utility programs, are exposed to performance risk but often do not have the expertise necessary to evaluate the complex technical details associated with an energy efficiency project. Regardless of the expertise and skills of the investors, transaction costs mount when multiple investors separately evaluate a project with expensive and time consuming technical due diligence processes.

For this reason, it is important that the project investor select a project development team with established experience and skills in energy efficiency project development. Furthermore, in order to protect their own best interests, it is highly recommended[1] that project investors hire an independent consultant (or consultants) to provide technical oversight and quality assurance services, as described in this specification.

The *Credentialed Project Development* team is responsible for developing a project based on sound engineering principles and accepted industry best practices as specified by the ICP Protocols and Project Development Specification. The Project Development Specification describes accepted approaches, recommended best practices, and resources that project development teams should utilize in order to adhere to these industry standards and protocols and achieve ICP compliance.

The *Credentialed Quality Assurance Provider* is required to be independent of the Project Development team and is responsible for reviewing the project components and associated documentation to ensure that the project is compliant with the ICP Protocols. The Project Development Specification serves as a reference for the QA Provider to review and verify that the approaches used by the Project Developer meet industry standards and ICP requirements. The ICP QA Checklist provides a step by step format for the review process and also serves as the instrument for recording the verification by the QA provider.

A single firm or individual can be both a Credentialed QA Provider and a Credentialed Project Developer, but cannot serve both functions for an individual project.

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[1] To obtain an Investor Ready Energy Efficiency™ designation the project must engage a credentialed ICP Quality Assurance Provider.

2.1   QUALITY ASSURANCE AND THE EEP FRAMEWORK

The Energy Efficiency Project (EEP) Framework is divided into five categories that represent the entire lifecycle of a well-conceived and well-executed energy efficiency project:

1. **Baselining**

    a   Core Requirements

    b   Rate Analysis, Demand, Load Profile, Interval Data

2. **Savings Calculations**

3. **Design, Construction, and Verification**

4. **Operations, Maintenance, and Monitoring**

5. **Measurement and Verification (M&V)**

ICP strongly recommends and expects that the QA provider be involved in the process early on during project development, so that issues can be identified and addressed as the project progresses, rather than at the end of a project when necessary information may be difficult to capture or when changes may have far reaching (and serious financial) implications. The QA provider should refer to the best practices and QA tasks listed in each section of the Project Development Specification to help guide the process of evaluating projects and to ultimately certify project compliance with the ICP Energy Performance Protocols.

Similarly, it is important that project development and associated quality assurance activities are performed at specific points in the development of an energy efficiency project, since the development of preceding components of a project may create a domino effect interfering with subsequent project components and results. For example, the baseline and end-use energy consumption estimates are used in the calibration of an energy model or bounding of energy savings predictions, as well as in the M&V efforts. Inaccuracies in the development of these key baseline components can affect the subsequent accuracy of the energy model, possibly resulting in over-prediction of energy savings estimates and/or an inaccurate assessment of verified energy savings.

The following table provides an overview of the specific project development and quality assurance tasks correlated with the project development timeline categories.

QUALITY ASSURANCE TASKS	Develop Baseline	Audit / ECM List	Savings Calculations / Investment Package	Design, Construction & Verification	Operations, Maintenance & Monitoring	Measurement & Verification (Post-Implementation)
PROJECT TASKS	Collect utility data	Collect building asset data	Develop / calibrate energy model	Develop OPV plan	Develop OM&M procedures	Option A/B: Collect post-retro energy / performance data
	Develop end-use energy usage	Collect building operational / performance data	Perform model / spreadsheet calculations	Perform OPV tasks	Set up FDD, develop RCx plan, or other monitoring method	Option A/B: Performance data analysis
	Collect utility rate info	Develop ECM descriptions	Develop costs / constructability	Develop / updated systems manual	Develop / update operator's manual	Option A/B: Verified savings calculations
	Load shape development		Develop / inform investment criteria	Perform building operators training	Perform building operators training	Option C: Post-utility data
	Develop energy use equation		Develop ECM bundles & packages	Develop M&V plan (before construction)		Option C: Identify / quantify non-routine adjustments
	Identify adjustments		Develop audit report			Option C: Regression based modeling
	Collect weather / occupancy data			Option A/B: Collect pre-retro energy / performance data (before construction)		All Options: M&V report
QA TASKS	Review and approve data, energy use equation and baseline model	Review and approve asset / operational / performance data	Review and approve ECM descriptions	Review and approve OPV plan	Review and approve OM&M procedures	Review and approve data and analysis
	Review and approve end-use energy use		Review and approve energy model / check calibration	Review and approve M&V plan	Review and approve FDD, RCx plan, or other monitoring method	Option C: Review and approve regression based model
	Review and approve utility rates		Review and approve savings calculations	Review and approve systems manual	Review and approve operator's manual	Option A/B: Review and approve verified savings calculations
	Review and approve load shapes		Review and approve costs / constructability	Review and approve training (interview building operators)	Review and approve training (interview building operators)	Review and approve adjustments and proper application
			Review and approve ECM bundles / investment package	Option A/B: Ensure pre-retro energy / performance data collected		

3.0   REQUIRED QUALIFICATIONS

The QA process relies heavily on the experience of the Credentialed QA Provider. The QA Provider needs to possess experience both with project development and technical reviews, so that they can effectively identify issues or concerns with the project-related methodologies, assumptions, and results.

A Credentialed QA Provider may be an individual, an independent firm, or a program. Providers must meet the following requirements:

- Be a licensed PE (if an individual) or have a licensed PE on staff to oversee and approve all review efforts (if a firm)
- Posses a minimum of five years of relevant energy efficiency project development experience, and three years quality assurance (technical review) experience, documented in the form of a CV outlining relevant project experiences
- Provide three references demonstrating relevant project development and quality assurance experience
- Attend the ICP Project Developer Credential training
- Complete the ICP Quality Assurance Provider Credential training

4.0   QUALITY ASSURANCE PROCESS

4.1   ICP CHECKLIST AND INVESTMENT PACKAGE

The ICP QA process requires the completion of the ICP Checklist to ensure that all necessary documentation, as described in the ICP protocols, has been properly developed and is available. These documents represent the Investment Package and serve as the foundation of an energy efficiency project.

It is the responsibility of the Project Development team to develop and assemble the required documentation and to make appropriate portions of this information available to team members, subcontractors, the QA provider, and stakeholders. The documentation should be clearly identified and organized so that recovery of and access to information is easily facilitated by team members and stakeholders.

During the QA process, the QA Provider is responsible for verifying that the Project Developer has adequately developed, organized, and supplied the required documentation.

4.2   QUALITY ASSURANCE REVIEW

The review of the methodologies, assumptions, and results for reasonableness represents an integral part of the QA Provider's role. The Project Development Specification presents specific QA tasks to be applied to each component of an energy efficiency project. Within each section of the Project

Development Specification, a list of specific QA tasks are detailed to help guide the review process. These QA tasks are listed within the Project Development Specification so that:

- The Project Development team can review these QA tasks and understand the expectations and activities that may be involved with the QA review process
- The direct relationship between the project best practices and QA tasks can be established

It is not feasible or necessary for the QA provider to recreate the entire project development process, and not all projects will require the application of all of the review tasks presented in the Project Development Specification. For this reason, it is important to determine the relative uncertainty and risk associated with each project component or measure and apply the appropriate level of review.

4.2.1 THIRD-PARTY

By definition, a third-party is someone who may be indirectly involved with, but is not a principal party to, an arrangement, contract, deal, or transaction. Any third-parties involved with an energy efficiency project should be contracted by the investors (building owner, etc), and not the project development team. Their responsibility is to represent the interests of the investors.

While various components of an energy efficiency project may involve the use of a third-party, within the context of ICP, there are two specific components of an energy efficiency project that require third-party involvement.

The first component involves measurement and verification (M&V) efforts. ICP requires that the M&V efforts be performed by a third-party M&V agent, or that the M&V efforts are overseen by a third-party. The third-party requirement ensures impartial development and/or oversight of verification of the energy savings achieved by the project.

The second component involves the QA Provider. As with M&V, the third-party QA Provider needs to provide impartial technical oversight as described in this specification for determination of ICP compliance. These efforts ensure that the consistency and integrity of the ICP process are being maintained which translates to protecting the best interests of investors, including building owners.

4.2.2 USE OF SOFTWARE

Software automation is increasingly utilized to assist with project development and review processes in order to increase scale. Software applications credentialed by ICP have been verified to facilitate the aggregation, organization, and review of the documentation package. These software applications incorporate document management functionality designed to deliver required project documents as defined by the ICP Protocols.

Software can also help to determine the reasonableness of assumptions, predict the economic performance of proposed measures, automate the uncertainty analysis process, check the accuracy of project components such as the developed baseline, and more. Of particular benefit to the QA process, is the functionality of software to deliver review consistency that validates data, analyzes

assumptions, and/or checks results against reasonable thresholds based on past benchmarking data in order to flag projects and components that deviate from the norms.

Although the use of software automation should be considered, ICP does not require the use of any software. Validating ICP compliance, analyzing project assumptions, and evaluating results may be accomplished by direct independent engineering review, or a combination of engineering oversight and software. Software applications are not intended to replace the experience of the QA provider and when software is utilized a review of the results by an engineer will still be required.

4.2.3   COMMUNICATION

While the QA Provider is third-party to the transaction, clear communication between the QA Provider and Project Developer is strongly encouraged. The QA provider is urged to take a collaborative approach with the Project Development team to resolve issues in order to develop a financially sound project built upon strong engineering and conservative assumptions. It is acceptable and appropriate to ask for clarification and to communicate with the Project Development team as necessary during the QA process, so long as the review process maintains a professional perspective and independence in their role as a third-party.

4.2.4   PROJECT ACCEPTANCE

If the QA Provider finds that the project does not comply with the ICP Protocols, the reviewer shall provide a specific description of each deficiency to the Project Developer to assist in any necessary re-working of the project. As necessary, the QA Provider may include additional findings highlighting any other areas that were causes for concern. The QA Provider will use the guidelines set forth in the Project Development Specification and associated resources, as well as their professional experience and opinion, to determine for each item what constitutes substantial and reasonable compliance.

While many aspects of a project will be well defined and substantiated, there will always be assumptions used in the project development process. The Project Development Specification provides guidance regarding the use and development of assumptions and inputs. Nevertheless, the reasonableness of these items may be brought into question and determining whether they are appropriate will rely heavily on the experience of both the Project Development team and the QA Provider.

As such, the Project Development team and QA Provider may not always agree on what is reasonable. Items brought into question should be discussed and the reasons for their selection justified to the extent possible by the Project Development team. However, if any issues cannot be resolved it is the responsibility of the QA Provider to document these items in the investment package including how they were resolved, or why they have been left open. This procedure will allow a project to continue moving forward despite irreconcilable differences of opinion between the Project Development team and the QA Provider.

Once the review has been successfully completed, the Quality Assurance Provider will complete and sign the QA Checklist to certify that the requirements of the ICP have been met based on the

reviewer's professional experience, available guidelines,and the ICP Project Development Specification. A signed and completed QA checklist makes the project eligible to be certified as an ICP Investor Ready Energy Efficiency™ project.

By signing this ICP QA checklist, the ICP Quality Assurance Provider attests to having reviewed the project development documentation and certifies that the project substantially follows the ICP Energy Performance Protocols and the ICP Project Development Specification. This Quality Assurance review and signature does not constitute a guarantee of energy savings performance, nor does it signify that the reviewer is taking professional responsibility for the required documents and engineering produced by the credentialed Project Developer.

4.2.5   OPTIONAL PROFESSIONAL ENGINEERING SEAL

While all Credentialed QA Providers must include a professional engineer (PE) as a prerequisite, the PE is not required to apply their seal to the QA Checklist to qualify a project as ICP Investor Ready Energy Efficiency™. An investor in the project may however request a sealed set of documents in advance from the QA Provider at their own expense.

5.0   PERFORMANCE PERIOD

The Investment Package should consist of all of the documentation required by the ICP Protocols that has been reviewed by the QA Provider and would typically be available at the point in time where investor due diligence would occur. It contains all of the information pertaining to the baseline and savings calculations, as well as the operational performance verification (OPV) plan, an ongoing management regime, and the measurement and verification (M&V) plan.

While the project may be certified as an Investor Ready Energy Efficiency™ project at this stage in the project's lifecycle, there are important tasks that still need to be accomplished as required by the ICP Protocols both during and after construction. These tasks and documentation requirements are specified in the protocols and detailed further in the Project Development Specification. These tasks vary by protocol, but generally include:

- Implementation of the OPV plan, and development of an OPV report or statement
- Training of the facility personnel
- Updates to the Systems Manual and Operator's Manual (or creation of these manuals if they do not exist)
- Implementation of the ongoing management regime (periodic inspection, BAS review, recommissioning, fault detection and diagnostics, etc.)
- Measurement and verification efforts and reporting

Since these tasks typically occur during the performance period of the project, after the project has received its Investor Ready Energy Efficiency™ designation, there is the potential to place less importance on these activities or eliminate them altogether. However, persistence of energy savings and M&V are critical foundational elements to the overall ICP framework and project performance.

It is recommended that the contracting documentation specify how and when these construction and post-construction tasks will occur in order to ensure that they are carried out by the Project Development Team or responsible parties as laid out in required plans.

Similarly, the QA process should also apply to all of these construction and post-construction elements as well. The QA Provider should be retained and included in all of these activities, providing the same level of ICP compliance and technical review as is involved with the development of the Investment Package. The QA Provider will subsequently help ensure that these items are paid the proper attention by the Project Development Team.