

4.0 Technical Approach

4.1 Samples: Preliminary Technical Energy Audit (TEA) and Final Investment Grade Audit (IGA)


Under separate cover, provide representative SAMPLE audits of a preliminary TEA and a final IGA that is applicable for an energy performance contracting project in a government facility. (See RFP for proper delivery media.)

In response to this section, provide a brief description of the audits, including energy and economic calculations, and verification that the sample audits were conducted by current members of the company's team proposes for the DAGS Energy Performance Contracting Program (HEPCP). Provide a description of the process your company uses for typical audits (TEA and IGA) in the types of facilities that will participate in the program. Note any changes that will be made to comply with requirements for the program. (Provide the SAMPLE audits under separate cover with an introduction repeating the response for this section.)

NORESCO has provided the Preliminary Technical Energy Audit and Final Investment Grade Audit Report for Churchill County School District as a separate attachment. This audit is similar in nature to Hawaii State agencies in size and type. The Churchill County School District audits include the evaluation of 12 buildings totaling over 600,000 square feet. During the Churchill County School District project, NORESO proposed and is implementing the following energy conservation measures:

- Lighting system upgrades
- High bay lighting upgrades
- Lighting controls improvements
- Building automation controls upgrades
- Replace heat pumps with packaged units
- Cooling tower fan VFD installation
- Building envelope improvements
- Interior water fixture retrofits

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- Transformer replacement
 - Network power management

Upon final completion, this \$2.7 million project will result in an annual savings of over \$230,000.

NORESCO's Investment Grade Audit Process

NORESCO's Investment Grade Audit process includes both technical and financial analyses. The technical engineering analysis evaluates physical changes to equipment and systems and to the entire facility as a result of the proposed energy conservation measures. The analysis is a logical, but creative, process involving accurate, careful characterization of existing operating thermal and electrical loads, and other resource uses. All factors that will affect the cost, feasibility, and operation of various systems are considered. Systems and components are selected with the flexibility, efficiency, durability, and performance to meet all loads and satisfy facility mission requirements and goals.

The financial analysis evaluates operating economics for current systems and all technically feasible competitive alternatives. It involves a life cycle analysis of various combinations of measures aimed at the selection of the optimum program portfolio. The analysis also includes sensitivity testing to future variations in parameters, such as operation schedules, maintenance options, and energy costs. The combined results of this technical and financial review are documented in clear, concise site survey reports at each key phase of development. This provides a quality decision-making tool for facility managers, with all supporting detail available for review.

Technical Energy Audit

NORESCO will conduct an initial site survey to define the scope of the project. The audit team will develop a full understanding of the existing conditions and identify energy conservation measures for inclusion in the project. NORESCO intends to identify and include all potentially cost-effective energy conservation measures in the targeted locations during the Preliminary Assessment, unless otherwise instructed by facilities staff.

During the site survey, NORESCO will continue to compile detailed information on energy usage of equipment targeted for potential energy conservation measures. The Team will construct a simple model of the facility's primary energy systems, distribution systems, end-use systems, and loads being served. They will gather data for a preliminary analysis of energy conservation measure potential, locate metering and monitoring points, and identify areas of focus for subsequent phases. Long-term facility master planning objectives are incorporated, including utility supply optimization, capital equipment upgrade, and efficiency improvements. A list of potential energy conservation measures are identified and screened, yielding a refined list of technically and economically feasible project opportunities. While the survey represents only the preliminary phase of the energy performance contracting process, quality work performed during this phase enables reliable preliminary decision-making and will improve the accuracy and efficiency of the subsequent analytical and design phases.

The deliverable for this phase is a Technical Energy Audit Report that will include an economic summary of measures and alternatives recommended for further consideration and the key assumptions that must be confirmed. The report will be presented to facility management for their review to serve as a basis for discussion of further steps toward implementation. Key success factors will be identified during the site visit to eliminate wasted effort in subsequent phases and to expedite the entire process.

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During the Technical Energy Audit phase, the energy conservation measures will be ready for selection by State agency's. The list of energy conservation measures will likely be quite long, and each energy conservation measure will have multiple building locations where it can be applied. This means that there will be a large number of choices facing the State agency to select energy conservation measures for final development. NORESO will work side-by-side with facility staff to help screen energy conservation measures so that the criteria are met and the optimal mix of energy conservation measures is selected for superior economic performance. To facilitate this decision-making process, data and recommendations from the Preliminary Assessment will be presented electronically with NORESO's proprietary EntelliChoiceSM software. This unique software provides the ability to analyze the savings and interactive effects for multiple facilities and energy conservation measures simultaneously. This enables NORESO and the State of Hawaii agency's to analyze the feasibility of alternative project options at the click of a mouse. If selected as the service provider for the State of Hawaii agency's, NORESO can present subsequent audit work via both hard copy and EntelliChoiceSM. The State of Hawaii agency's can use this resource to expedite the decision-making process while providing added assurance that every option has been considered and the most sensible options are being selected. Depending on how the State agency's wish to proceed, it is also possible that the Technical Energy Audit and the next phase, the Investment Grade Audit, can be combined into a single process.

Investment Grade Audit Plan

The Investment Grade Audit plan is developed to define the energy savings potential and system infrastructure upgrade requirements. As the project proceeds, results of this plan will be carried forward, additional information will be gathered, and the team will consult regularly (internally and with facility representatives at key milestones) to continuously screen measures in increasing detail and refine them to match site conditions and facility needs. Interaction between measures (both physical effects and analytical impact) is given increasing attention so that an optimal package of energy conservation measures is developed. The bottom line here is that NORESO will use a truly collaborative, bottom-up process rather than the more commonplace ESCO process that revolves around on a set of preconceived energy conservation measures that can compromise quality and leave custom applications and unique opportunities undetected. Our phased approach will also afford the opportunity for optimal quality control.

The Investment Grade Audit plan consists of a preliminary review of the mechanical, electrical, and control systems. At this stage, rough estimates of costs and savings for major energy conservation measure categories are prepared as an early indication of the order of magnitude of project size. .

A key element of the Investment Grade Audit plan is the identification of facility goals and objectives. These are critical factors that must be identified early in the process. They become important screening criteria for energy conservation measure review throughout the project development process. NORESO will record the following facility needs and objectives through discussions with facility management:

- Long-range master plans for renovation, expansion, or new construction.
- Cost reduction goals, financing preferences, and risk tolerance.
- Equipment or fuel preferences.
- Design standards to maintain consistency with existing equipment and spare parts inventories.
- Current operational and/or maintenance problems.
- Equipment replacement needs dictated by age, capacity, or refrigerant phase-out plans.

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- Price and risk management objectives for the procurement of energy supplies.
- Constraints such as reliability, safety, noise, aesthetics, and environmental regulations.
- Inadequate comfort control or indoor air quality.

The result of this effort identifies preliminary scope, objectives, and rationale, based on the utility costs provided and current published utility rates. Subject to feedback from State of Hawaii, subsequent modifications to the plan and its final acceptance, NORESCO will proceed with a full on-site survey and Investment Grade Audit.

Investment Grade Audit

The Investment Grade Audit will be initiated following acceptance of the Investment Grade Audit plan and authorization to proceed with the next phase. This process will include further study of the measures proposed and a more detailed analysis of the overall lighting, energy management, HVAC, and water consuming systems.

During the Investment Grade Audit, NORESCO conducts a detailed site survey to refine the scope of the project. The Survey Team develops a full understanding of the existing conditions and identifies energy conservation measures for inclusion in the project. NORESCO intends to identify and include all potentially cost-effective energy conservation measures in the targeted locations unless otherwise instructed by facilities staff.

During the Site Survey, NORESCO continues to compile detailed information on energy usage of equipment targeted for potential energy conservation measures. The Team will construct a model of the facility's primary energy systems, distribution systems, end-use systems, and loads being served. They will gather data for a detailed analysis of energy conservation measure potential, locate metering and monitoring points, and identify areas of focus for subsequent phases. Long-term facility master planning objectives are incorporated, including utility supply optimization, capital equipment upgrade, and efficiency improvements. A list of potential energy conservation measures are identified and screened, yielding a refined list of technically and economically feasible project opportunities.

The Investment Grade Audit will further consider quantitative attributes; such as energy cost reduction targets, replacement of old equipment and expansion of system capacity, or qualitative attributes, such as preferred fuel and technologies (e.g., renewable resources). Constraints or limitations to the acceptance of certain equipment and system characteristics will set boundaries and eliminate certain measures from further consideration. Constraints may include factors such as noise levels or aesthetics, facility preferences, or reliability requirements, or may be externally imposed factors such as environmental regulations.

The technical project team will then articulate and prioritize project objectives framed within the facility's goals and constraints, thus establishing the criteria that identify the most valued system characteristics. As they are available, long-range planning documents will be reviewed in the process. In their absence, we will work closely with the facility planning staff to determine those critical but non-documented long-range issues that might be affected by the proposed energy conservation measures. Clarity in this early task of setting objectives will greatly facilitate the efficiency of screening and selection and the eventual ranking of project opportunities.

The result of the Investment Grade Audit is the ESPC proposal final cost and savings estimates and the terms of the proposed Energy Savings Performance Contract. This includes technical and financial results for individual measures and for the recommended package of measures as a whole, including interaction

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between measures. The proposal documents contain all of the technical and financial assumptions and analysis that went into preparation of these results.

While different types of information and different levels of accuracy will be required during different phases of the Investment Grade Audit process, the same basic types of information will be required to complete most integrated studies. Following is a representative listing of some of the basic technical and financial information that will be required. The NORESOCO Team, led by an experienced Senior Project Developer, will gather this information through site Investment Grade Audit work, careful review of facility documentation, interviews with operations staff, and background research.

Technical Information

Technical information will be gathered, reviewed, and confirmed through observation and inspection. Missing data will be identified. Data will be used to develop engineering assumptions for analysis of energy savings. Facility management and operations information will become constraints to ensure that energy conservation measure concepts are compatible with standard facility practices and that retrofits recommended by the NORESOCO Team enhance rather than burden facility operations. Technical information resources include the following areas:

- Facility documentation will be reviewed and its accuracy confirmed
- Operating conditions will be assessed through observation and interviews with facility staff
- Operations management structure and practice will be reviewed

Financial Information

Detailed financial information will be needed as input to NORESOCO's financial models. The performance contract requires more parameters to predict life cycle costs and cash flows than are needed for simple payback evaluations. Financial data review involves the following areas:

- Incremental economic values must be determined.
- Long-term life-cycle factors must also be integrated into the economic analysis.
- Incremental capital investment costs to be integrated.

Table 16 illustrates the depth of information gathered and processed during an Investment Grade Audit.

Table 16. NORESO checklist of review items – Investment Grade Audit.

Technical Information	
Facility Documentation	<p>Mechanical, electrical, and architectural drawings; Site plans and floor plans.</p> <p>Billing histories for all metered usage (including purchased CHW, steam, and water).</p> <p>Utility rates (copies of the current tariff books).</p> <p>Records from facility-owned sub-meters.</p> <p>Demand profiles, if available (24 hour demands for selected day types).</p> <p>Equipment inventory (e.g., from PM programs); Nameplate and manufacturer's data.</p> <p>Automation system documentation (point lists, manuals, diagrams, sequences).</p> <p>Previous submittal packages and equipment operating manuals.</p> <p>Reports from previous studies.</p> <p>Operating logs, EMS computer trend logs, maintenance records, balancing reports.</p>
Operating Conditions	<p>Space inventory by function, with location and floor area.</p> <p>Environmental control standards (temperature/humidity, ventilation, lighting).</p> <p>Operating schedules (daily, weekly, seasonal hours of operation) for each space.</p> <p>Known maintenance or operational problems; Critical deferred maintenance items.</p> <p>Shortfalls in equipment capacity or distribution system bottlenecks.</p> <p>HVAC control strategies (system operating schedules, setback, and reset schedules).</p> <p>Central equipment operations (sequencing of equipment and fuel sources).</p>
Operating Conditions	<p>Maintenance practices (standard preventative or predictive maintenance intervals).</p> <p>Work order scheduling systems; Staffing levels.</p> <p>Service contracts with outside firms.</p> <p>Long-range facility planning documents such as a Master Plan.</p> <p>Design standards (vendors and materials, labeling/tagging, controls compatibility).</p> <p>Applicable regulations and codes.</p> <p>Operating budgets (utilities and maintenance).</p>
Financial Information	
Incremental Operating Costs	<p>Electricity, natural gas, purchased chilled water, other fuels, and water/sewer use.</p> <p>Steam or other heat sources at each thermal level (temperature) required.</p> <p>Operations and maintenance, including personnel and special training requirements.</p> <p>Environmental permitting and emissions controls costs.</p> <p>Cost of standby electricity (used in electric generation feasibility studies).</p> <p>Cost of capital/debt and cost of insurance.</p> <p>Cost/value of required or avoided floor space.</p> <p>Reliability and redundancy requirements and associated downtime costs.</p>

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Table 16. NORESKO checklist of review items – Investment Grade Audit.


Capital Investment Costs	<p>Technical project support (engineering, planning, commissioning, M&V costs).</p> <p>Costs of systems to be installed with quotes from vendors and subcontractors.</p> <p>Energy delivery infrastructure and generation equipment.</p> <p>Turnkey construction costs with construction management, demolition, disposal, etc.</p> <p>Utility program incentives or penalties.</p> <p>Startup and debugging costs and cost of production downtime.</p> <p>Permitting, development, legal, and other consulting fees.</p>
Life-Cycle Cost Factors	<p>Cost/value of electricity (internal use and, where applicable, power sales).</p> <p>Natural gas and fuel supply cost, contract commitment, and contract security.</p> <p>Escalation of energy, water, and O&M and repair costs (and contracts).</p> <p>Replacement costs and salvage value.</p> <p>Performance degradation.</p>

Overview of Investment Grade Audit Steps

The following steps are performed sequentially during the Investment Grade Audit phase. The work required in each step is significant, so it is important to proceed logically and perform critical measure screening at each step to avoid wasted effort on premature analysis, design, or construction review. The entire team consults on a daily basis during execution of each of the following steps to screen measures against technical and financial criteria, as well as facility objectives and constraints. A brief description of each step follows (Investment Grade Audit steps are defined in greater detail later in this section).

1. Selecting the Appropriate Analytical Tools: Since the energy analysis is much more rigorous and the results must be accurate and verifiable, it is important to carefully select the tools used to predict energy savings. NORESKO has extensive experience with energy modeling, and the Project Team will select tools that best fit the unique nature of each energy conservation measure, its interaction with other measures or other load impacts, and the availability and quality of data. The Project Team will also work closely with the Measurement and Verification Team to take advantage of opportunities to use energy modeling for both savings prediction and verification.
2. Load Development: This is a very important aspect of the analytical process requiring engineering wisdom and technical experience. Consequently, NORESKO places high value and emphasis on this effort in the energy conversion measure analysis. Load profiles that will be affected by an energy conservation measure are carefully developed through a combination of modeling and metering. The analysis accounts for the time-dependent nature of the loads—daily, weekly, and seasonal. Other factors that influence load shapes such as occupancy and weather are characterized, typically through regression analysis. All resulting load profiles are then verified by reconciliation with billing histories.
3. System Performance and Energy Usage: The load profiles are converted to primary energy consumption through equipment performance analysis. The analysis accounts for part-load performance and operating conditions, such as chilled water and condenser water temperatures that affect chiller performance. Manufacturer's performance curves are used to model these effects. Auxiliary energy usage is also calculated based on confirmed operating sequences.
4. Baseline Determination: System performance is characterized by monthly utility consumption and, where applicable, peak demand. These results are converted into operating costs using all features of the utility

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rate structure (demand charges, ratchets, time-of-use rates, etc.). In cases where multiple fuels are used by primary equipment (e.g., dual-fuel boilers), a typical aggregate utility rate will be developed and used.

5. Savings Analysis: Once the detailed analysis models are developed, it is relatively easy to calculate savings by adjusting model inputs to reflect changes in equipment efficiencies, controls, operating strategies, etc. What is more difficult is to accurately account for interactive effects. The analysis of utility cost savings will incorporate interactions at all levels—measure-to-measure interactions, load-to-equipment interactions, impact of future facility changes, and future utility supply-side changes. Each of these interactions will be tested using dynamic analysis models. The final results will reflect all interactions with assumptions clearly stated for each.
6. Refinements to Selected Project Measures: Non-energy factors are considered, such as redundancy, reliability, capacity factors, and matching of load requirements to equipment delivery/distribution system capabilities (such as pressure or temperature). Energy conservation measures are subsequently modified or rejected.
7. Consideration of Environmental and Other Code Compliance Impacts: At this time, a design review for environmental and other code compliance impacts provides additional screening criteria. Construction experts also review energy conservation measure concepts for installation issues such as structural capacity, rigging/demolition, and utility service that would affect capital costs.
8. Evaluating Operation and Maintenance Requirements: The NORESCO Operation and Maintenance Team assesses current and future O&M requirements for all new solutions and works with the Agency to determine the best value solution to provide O&M. Together we determine who will provide O&M (Agency, NORESCO, subcontractor) and determine if any savings can be expected. The cost to provide O&M will be included in the project cashflow. Measures often result in quantifiable savings in lower maintenance, planned overhaul or replacement costs, consumables (such as lubricants), spare parts, and waste disposal charges. Also, improvements in less quantifiable effects such as maintenance staffing, service reliability, improved comfort, and indoor air quality will be identified.
9. Evaluating Utility Supply Options: As directed by the facility, NORESCO will prepare recommendations for alternative procurement strategies for fuel and power purchase. These issues are often related to energy conservation measure recommendations, since the energy conservation measures impact load profiles that can place the facility in an advantageous buying position.
10. Developing an Interactive Summary: A decision making tool will be prepared that allows facility representatives and NORESCO to jointly agree on a package of measures for implementation. The accompanying measure economics will reflect a reconciled base case utility cost scenario, as well as any necessary revisions to the base case for planned facility changes. The results will also incorporate all interactive effects.
11. Equipment Selection: The design team will develop conceptual designs, review equipment alternatives, and make optimized selections of types, sizes, and fuel options. All equipment selected will satisfy the requirements of governing agencies such as local and state codes, and testing and approving agencies. Equipment is also selected to minimize maintenance costs and emissions of pollutants.
12. Prepare Budget Estimates of Incremental Capital Cost: The Construction Team will work with these selections to ensure footprint and height constraints are met and to prepare budget cost estimates to install this equipment and make associated infrastructure changes. Vendor and subcontractor quotations will be obtained for major equipment and a complete construction cost estimate and schedule will be prepared.

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13. Life-Cycle Financial Analysis: At this point, all of the pieces are in place to prepare a cash flow summary for the life of the ESPC. The cash flow will include all time-dependent operating cost changes and financing for both the construction period and the total term. The financial model results will be present in the format required by the facility.
14. Final Investment Grade Audit Report: Details of work performed during the Investment Grade Audit and all technical and financial recommendations will be included in a written proposal for review by the State of Hawaii. As noted previously, all of the potential measures can likewise be presented via accompanying EntelliChoiceSM software that will enable the State of Hawaii to assess the feasibility of additional project options at the click of a mouse.

Main Analytical Components

The three main analytical components of a Investment Grade Audit are:

- Acquisition, analysis, and aggregation of metered and field-collected data.
- Energy evaluation and modeling.
- Utility bill reconciliation.

Extensive direct system metering and recording have a firm scientific basis, but also involve hands-on activities, such as the practical determination of what to meter, where to meter it, how to meter it, and how long to meter it, as well as activities such as selecting and installing probes, sensors, and data acquisition systems. Examples include tapping voltage and current, installing temperature probes into pipes, setting airflow measurement devices into ducts, over registers and exhaust hoods, and measuring power and energy, fuel flow, etc.

Critical to the design and application of an effective metering process is understanding how the acquired data will be used. The temperatures, flows, and power requirements of equipment must be analyzed in a manner that reveals the actual operating characteristics and resource usage of existing equipment and allows proper sizing of new equipment, development of optimal operating strategies, and determination of associated costs and achievable savings. This process can also be extended to the development of baselines and system performance prediction tools to be used for savings verification programs.

The measurement process, be it baseline or post-implementation, continues for a period long enough to encompass the normal variation of the significant factors, or independent variables, which determine the loads and operation of each system. When system-specific metering techniques are used, the Project Team will make a determination as to the duration of the metering activities. For equipment serving loads that operate consistently over time, short-term metering will be most appropriate. For systems with loads that fluctuate, such as those affected by weather, the data will include the key variables that are believed to impact load variation. Occupancy patterns or other operational changes that may influence energy usage will also be covered by the metering period. Data will be gathered through intermediate or even long-term metering, depending on variations, the magnitude of the project, and the required degree of accuracy. In either case, metered data always includes time stamps and supplementary parameters, or independent variables as appropriate. The resultant data can be statistically analyzed to determine the effect of those independent variables on resource consumption and demand, deriving their coefficients in a multi-variate linear regression.

Since metered data covers a specific range of operating conditions, this analytical process yields an operating performance prediction tool to be used to reflect usage and demand, and therefore operating cost, under any given set of conditions. Examples of independent variables include weather conditions, occupancy, and

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process production quantity. From this, the baseline performance and usage for each system can be developed, which is the original measured consumption given any set of time-dependent values for the independent variables. The same process can be followed for establishing post-implementation performance.

Computer building load, system operation, and economic analysis simulation modeling using software such as DOE-2.1, TRACE©, or HAP© is also a valuable tool in the Investment Grade Audit process. It allows for interactive analysis of multiple measures and simulation of the impact of proposed and actual changes in facility-wide systems and operations over time. It also allows for rapid testing of numerous potential options for each application type under varying conditions. Simulation modeling automatically accounts for measure interactivity, time-of-use utility rates, independent variables (such as weather), and the effect of a wide range of potential system optimization strategies. Simulations of conditions that can critically affect building and equipment loads (e.g., solar, partial shading, variable schedule dependent activities, building mass, multiple HVAC optimization strategies, etc.) are straightforward with such modeling and can be arduous and less accurate with other methods. When based on the results of field inspection and calibrated with actual metered data, modeling will allow for consistently reproducible results of the effects of long-term system changes at the facility.

Utility bill reconciliation refers to the matching of analytical results, such as those provided by simulation software, with actual historical records. When adjusted for any given historical year's operation, utility rates, and weather, the baseline model will be able to reproduce the actual costs shown in the historical records. If the predicted and historical results agree (± 5 to 10 percent) for a range of base activity, the baseline model is validated. NORESO seeks to reconcile all utilities on a monthly, annual, and peak demand basis to ensure model validity.

When these three main analytical components are used together, the metered data and utility bill data provide a factual basis by which to calibrate the model so that results are fully grounded in reality. When so validated, the computer simulation model can then provide a high-powered tool capable of evaluating measures interactively to produce optimal system configurations and can rigorously analyze savings projections.

Table 17 summarizes how NORESO processes information during the Investment Grade Audit phase of the project. The table includes the work performed to process and analyze the technical and financial information listed the table presented earlier, and the results and/or deliverables of that work.

Table 17. NORESO Summary of work effort – Investment Grade Audit.		
Category	Scope of Work Performed	Results and Deliverables
Utility Information	Graphical analysis of profiles for load management and self-generation or cogeneration opportunities; Rate review, fuel source assessment, supply options; Reconcile models to highest resolution data available, at least to monthly usage and peak demand.	Fuel switching opportunities, alternative supplies, alternative procurement strategies; Models are accurate and reflect actual usage patterns and end-use consumption.
Equipment	Determine metering points, methods, and durations; Establish data analysis plan in advance (e.g., regression); Include auxiliaries (pumps); Establish equipment performance curves.	Verified baseline usage encompassing normal load variations; Higher certainty in savings estimates.
Facility Documentation	Verify accuracy of documentation; Refine ECM concepts to reflect additional information.	Improved accuracy; Better screening for feasibility; Time savings during later phases.

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Table 17. NORESCO Summary of work effort – Investment Grade Audit.

Category	Scope of Work Performed	Results and Deliverables
Facility Needs	Accommodate all planned changes into ECM analysis; Review recommended ECMs against these requirements.	Load shape impacts will be included; ECMs may be altered.
Constraints	Evaluate compliance impacts on ECMs; Review measures for compatibility with end-use requirements.	May uncover opportunities for beneficial change in operating strategies (e.g., pressure reduction, distribution system changes).
ECM Savings	Determine optimal level of analysis effort; Develop energy analysis models (building simulations and/or custom applications); Calibrate to billing history; Supplement with metering.	Accurate analysis of complex measures using validated model; Based on accurate load profile Includes interactive effects; Complete cost savings calculations using full rate structures.
ECM Costs	Review construction conditions with subcontractors.	Preliminary estimates (\pm 20 percent) for screening and refinement.
Financial and Contractual	Run financial models with all first costs and recurring costs.	Cash flow projections including finance charges M&V costs, O&M cost and savings; Construction financing, draw-down schedule.
Design Issues	Review ECM concepts for equipment locations, utility service, and other design feasibility issues; Review impacts and test economics of emissions monitoring and controls.	ECMs can be designed to meet standards; Conceptual designs and equipment selections.
Construction Issues	Review ECM impacts; Prepare installation and commissioning budgets.	Detailed cost estimate with line item breakdown, materials and labor by trade, plus other costs; Installation schedule.
Operational Issues	Estimate current and future O&M costs; Assess personnel requirements, including training.	O&M savings incorporated into life-cycle cost analysis; Preliminary training plan; Analysis reflects actual operating strategies (e.g., sequencing of chiller pumps).

NORESCO's Investment Grade Audit approach will comply with the requirements of the State of Hawaii as referenced in the Request for Proposals No. RFP-08-022-SW.