FlexTech Report and ASHRAE Energy Audit Requirement Comparison





This document highlights the differences and similarities between NYSERDA's FlexTech program report requirements and the ASHRAE Standard 211-2018 Energy Audit requirements.

It is mandatory that all FlexTech projects meet FlexTech report requirements. Consultants are encouraged to review this document and ensure that FlexTech reports adhere to the agreed upon scope of work.

The table below outlines the ASHRAE Standard 211-2018 requirements that are not covered by NYSERDA FlexTech report requirements. Scopes of work that refer to any standard other than the NYSERDA FlexTech report requirements must adhere to that standard in addition to meeting FlexTech report requirements.

ASHRAE SPECIFIC REQUIREMENTS			
Introduction	n & Background		
- Key Project Dates	- Building Envelope Construction / Tightness		
- Project Contact Information	- HVAC Controls		
- Space Breakdown (Function / Occupancy,	- Lighting Controls		
Conditioned / Unconditioned)	- Representative Lighting Fixture Count		
- Building History (Date Constructed, Renovated, Commissioned)	(or Room-by-Room Inventory)		
- Onsite Renewables	- Plug Load Power Density		
Utili	ity Data		
- Utilty Bill Data (IDs, Interval, Detailed Rates)	- End Use Breakdown		
- Energy Usage Intensity	- Submetering		
Measu	re Analysis		
- Simple ROI, Measure Life, Incentives / Taxes	- Distributed / Renewable Energy Resource Analysis		
Econom	nic Analysis		
- Note Hazardous Materials (and associated costs to remediate)			
Supporting Documentation			
- Utility Rate Schedule	- Equipment Specifications		
- Lighting and Inventory Tables	- ASHRAE 211 Compliance Form		
- Operations and Maintenance Logs	- ASHRAE 211 Reporting Form		



ASHRAE 211-2018 LEVEL 2 ENERGY A	UDIT	NYSERDA FlexTech PON 4192	
Level 2 Reporting Requirements	Reference	NYSERDA Flex Tech Reporting Requirements	Reference
 Overall assessment of benchmarking and energy performance Aggregated savings and costs of recommended measures Table of recommended measures with savings and costs 	Appendix D (Outline Section 1)	Executive Summary: Provide a high-level project summary relevant to the customer's objectives (ex. the FlexTech project's intent, approach, and tasks performed, findings, recommendations, the economics of the recommendations and explanation of any deviations from the Scope of Work during the project). Project Summary Sheet: The content in this summary table is required in all project reports (see Attachment B-2). The table provides an overview of the project metrics by identifying the following metrics by measure: payback, cost, and savings in dollars, MMBtus, kWh, kW (where appropriate), current energy consumption at the facility, utility costs/rates used in the analysis and the status of each evaluated measure.	Attachment B-1
Introduction	Reference	Introduction	Reference
- Audit scope	Appendix		
- Key dates - Contact information	D (Outline Section 2)	n/a	n/a
Building Information (Combines ASHRAEL Level 1 & 2 Requirements)	Reference	Background	Reference
ASHRAE Level 1 Requirements: a.) Building name and / or identification. b.) Client name (building, owner, operator, or tenant). c.) Key Contacts. d.) Site address. e.) Gross floor area. f.) Classification of building uses; if multiple uses, fraction for each use. g.) Space breakdown. h.) Number of stories. i.) Year constructed / occupied and dates of renovations / additions. j.) For commercial , occupancy profile (hours and number of occupants); for multi-family, number of residents. k.) For multi-family, number of units / percent occupied. l.) Date of previous energy audit / study. m.) Problems / needs identified in walkthrough survey. ASHRAE Level 2 Requirements: a.) Building type and use:	6.1.1.1, 6.2.1.1 & Appendix D (Outline Section 3)	Provide information about the Customer and the project that is relevant to the study (ex. type of business or organization, average number of employees per location.)	Attachment B-1

ASHRAE 211-2018 LEVEL 2 ENERGY AUDIT		NYSERDA FlexTech PON 4192	
Building Information (Combines ASHRAEL Level 1 & 2 Requirements)	Reference	Background	Reference
Building envelope a.) Roof - Gross roof area - Description of the condition of the roof - Exterior material - Insulation level (R-value or U-value) b.) Opaque walls (above ground) - Gross area of the wall - Exterior material - Insulation level (R-values or U-values) c.) Fenestration level (R-values or U-values) c.) Fenestration (windows and doors) - Total area of the fenestration - Fenestration-wall ratio - Glazing frame type - Exterior door area and constructions - Fenestration seals d.) Floors and underground walls - Floor type - Underground wall area and insulation level (R-value or U-value) e.) Overall enclosure tightness - Results of assessment of the enclosure's overall tightness against air infiltration/exfiltration including a statement of the auditor's methods used, criteria, evidence, and basis of evaluation (Assessment shall include an overall condition rating)	6.2.1.2 & Appendix D (Outline Section 3)		
HVAC Inventory. Equipment inventory shall represent 80% of the energy use allocated to HVAC and SHW/DHW in the end-use allocation. a.) System type (such as rooftop, split, direct expansion [DX], heat pump, variable refrigerant flow [VRF], variable air volume [VAV], constant air volume [CAV], central plant, or combination thereof) - Year installed - System design capacity - Assessment of general condition b.) Central plant - Boiler type, fuel, capacity, rated efficiency - Chiller type, fuel, capacity - Cooling tower and fluid coolers (type, capacity) - Assessment of general condition c.) Distribution System and Ventilation - Air distribution system configurations (multizone, dual-duct, VAV, induction system, chilled beam, fan-coil, perimeter radiation) - Water distribution system configurations (variable flow, constant flow) - Outdoor air control type (economizer type [temperature, enthalpy]; heat recovery, where applicable; dedicated outdoor air system [DOAS], where applicable) - Assessment of general condition d.) Controls - Pneumatic or direct digital control (DDC) - Zone controls (core, perimeter, space - Building automation system (BAS)	6.2.1.3 & Appendix D (Outline Section 3)	Provide information about the Customer and the project that is relevant to the study. A description of all existing building systems evaluated, including but not limited to sizing, location, operation, age, condition, and efficiency, should be included.	Attachment B-1

ASHRAE 211-2018 LEVEL 2 ENERGY A	AUDIT	NYSERDA FlexTech PON 4192	
Building Information (Combines ASHRAEL Level 1 & 2 Requirements)	Reference	Background	Reference
Service Hot Water (SHW) / Domestic Hot Water (DHW):			
a.) System type and equipment ratings. Equipment characteristics such as energy input type, heater type, storage, recirculation.	6.21.4 &		
b.) Operating conditions. Efficiency, temperature control, and settings; storage, delivery, use, recirculation temperatures; uses, probable load profile; observed leakage; tank and pipe insulation; recirculating pumping and control.	Appendix D (Outline Section 3)		
c.) Assessment of general condition.			
Lighting: a.) Interior lighting: - An inventory of lighting types, fixtures, lamps, wattages, and ballasts by space type A listing of lighting control system types. b.) Exterior lighting: - An inventory of exterior lighting types, fixtures, lamps, wattages, ballasts, and areas serviced by each A listing of lighting controls, including the lighting services controlled by each. A room-by-room fixture count is not necessary for Level 2; however, the qualified energy auditor shall include a representative sample.	6.2.1.5 & Appendix D (Outline Section 3)	Provide information about the Customer and the project that is relevant to the study. A description of all existing building systems evaluated, including but not limited to sizing, location, operation, age, condition, and efficiency, should be included.	Attachment B-1
Process and Plug Loads: a.) Process loads shall be identified. b.) Plug loads shall be listed, including; - Approximate installed power density (W/ft2 [W/m2]) of plug loads in the building. - Estimated office equipment, including number and type of computers and monitors. c.) Conveyance equipment shall be identified, including their condition.	6.2.1.6 & Appendix D (Outline Section 3)		

ASHRAE 211-2018 LEVEL 2 ENERGY A	UDIT	NYSERDA FlexTech PON 4192	
Historical Utility Data	Reference	Background / Supporting Documentation	Reference
Utility data for a minimum of 12 consecutive months, aggregated for the whole building by service class, shall be reported.	6.2.2 & Appendix D (Outline Section 4)		
a.) Monthly utility data - Utility or other energy suppliers and account numbers. - Utility rate schedule (standard, time-of-use, block structure, demand charges [ratchet or nonratchet], and power factor charges). - Meter number and rate / tariff schedule for each meter; total number of meters by fuel (or total meters sampled). - Onsite generation, including renewable energy (solar and/or wind) and cogeneration sources, including an identification of the portion used on site and the portion exported. - Month or other data period, including read or delivery dates. - Number of days in month or period. - Electric use (kWh) by rate periods. - Actual or billed (or both if reported) peak electric demand (kW), identified as on-peak, midpeak, and off-peak. - Electric cost (\$). - Monthly or period load factor (%). - Peak or billed fuel, steam, hot water, or chilled-water demand, if reported. - Fuel or other energy source cost (\$). - Energy produced by onsite renewable or other sources. b. Delivered bulk fuels (nonmonthly). c.) Annual data. EUI (kBtu/ft2-yr or MJ/m2-yr) and ECI (\$/ft2-yr or \$/m2-yr), shall be reported with normalization parameters if applicable. The total energy consumption for each energy source types shall be calculated and recorded. - The consumption of all energy source types shall be totaled and must equate to the total historical building energy consumption. A pie chart or other visual representation that shows the breakdown percentage share of all energy source types present at the building. d.) Submetering: the systems metered, the frequency of data recording, and a description of the data acquisition system (fixed, portable, or integrated with the BAS), shall be provided.	6.2.2.1 & Appendix D (Outline Section 4)	Provide information about the Customer and the project that is relevant to the study (ex. annual energy costs by fuel type, electric and gas suppliers, rate tariff, etc.). Historical energy costs (minimum 12 months).	Attachment B-1

ASHRAE 211-2018 LEVEL 2 ENERGY AUDIT		NYSERDA FlexTech PON 4192		
Historical Utility Data	Reference	Background / Supporting Documentation	Reference	
Utility Rates and Structures: a.) Tariff name or ID number. b.) Energy rate structure and the marginal values of the following used in analyses: - Incremental block rate structures for energy use. - Demand rates and structure (blocks or ratchets). - Ratchets. - Seasonal, time-of-use, or real-time rates that may be in effect. - Energy service provider (ESP) or other independent commodity purchase pricing and other applicable contract terms - Interruptible rates in effect. c.) Back-up fuels if used. d.) Taxes (sales, gross receipts, locality, other), fuel cost adjustments, and other surcharges. Description of how rate impact energy costs and how they are treated in energy and demand cost savings. For calculations, average energy costs shall not be used unless the underlying rates is indeed constant.	6.2.2.2 & Appendix D (Outline Section 4)			
Report End Use Breakdown. The energy consumption of end-use systems shall be reported. End-Use System Energy Consumption Reporting Methodology: a.) If used, spot measurements of end uses, a description of the measurement method and the analysis used to calculate annual estimates from the measured data. b.) Calculations of equipment performance and a brief narrative description of the calculation methodology and inputs used. Compilation of End-Use Energy Data: a.) For each end-use system type, the measured or calculated annual energy consumption shall be listed by end-use system type and energy source type in tabular format. b.) For each end-use system type, the combined energy use of each energy source type shall be recorded in units of that source type. c.) The total building energy consumption shall be in kBtu or MJ. d.) The end-use energy consumption percentage for each end-use system type shall be the total energy use for that end-use system type divided by the total building energy consumption and sum to 100%. The summation shall be presented in a pie chart or other visual representation.	6.2.3 & Appendix D (Outline Section 4)	Provide information about the Customer and the project that is relevant to the study (ex. annual energy costs by fuel type, electric and gas suppliers, rate tariff, etc.). Historical energy costs (minimum 12 months).	Attachment B-1	

ASHRAE 211-2018 LEVEL 2 ENERGY A	UDIT	NYSERDA FlexTech PON 4192	
EEM Summary	Reference	Evaluated Measures Findings / Supporting Documentation	Reference
Energy savings opportunities shall be reported.	6.2.4 & Appendix D (Outline Section 5)		
 Low-Cost and No-Cost EEMs. Measures that can be implemented within the O&M budget. a.) Describe the existing conditions that provide background for the basis for each recommended measure. b.) Describe each recommended measure and the actions required for implementation. c.) List major assumptions used in the savings calculations for each measure. d.) List major assumptions used in the cost estimate for each measure. e.) Present a summary of the savings for each measure, including annual energy use by energy source, electric demand, annual energy cost, and annual nonenergy cost savings. f.) Present a summary of the implementation cost (if any) for each measure, simple payback period in years, and simple ROI. g.) List any ancillary (nonenergy) impacts of the measure that would be relevant to decisionmakers 	6.2.4.1 & Appendix D (Outline Section 5) Evaluated Measure Findings: Provide a description of the evaluated measures, such as what was evaluated, analysis results, proposed conditions, and recommendations. Include reasons for recommendations on all energy efficiency measures and capital improvements. For measures that were evaluated and not recommended, provide narrative as to why the measure was not recommended. Energy cost savings should be calculated using building specific utility rates and should take		
 Capital EEMs a.) Describe the existing conditions that provide background for understanding the basis for each recommended measure. b.) Describe each recommended measure and the actions required for implementation. c.) List major assumptions used in the savings calculations for each measure. d.) List major assumptions used in the cost estimate for each measure. e.) Discuss the impact of each measure on nonenergy costs. f.) Present a summary of the savings for each measure including energy savings by source, electric demand savings, energy cost savings, and nonenergy cost savings. g.) Present a summary of the implementation cost for each measure, the approximate measure life, the simple payback period in years, and the simple ROI. h.) Calculate available utility, tax, or other incentives applicable to each measure, and present the impact of these incentives on the implementation cost, simple payback, and simple ROI. i.) List any ancillary (nonenergy related) impacts of the measure that would be relevant to the decisionmakers. j.) State the order in which the measures were considered and the rationale for that order. 	6.2.4.2 & Appendix D (Outline Section 5)	into account both energy consumption rates and demand rate(s) (Marginal Utility Rate Analysis). - Maintenance cost estimates should be included for each evaluated measure. Maintenance costs should include preventive maintenance, repair and other general maintenance costs required to keep equipment operational. Additional benefits: Reports should strive to include information on additional potential project benefits, such as increased productivity, job creation or retention, greenhouse gas reduction, or environmental benefits. Include as a qualitative description of other project benefits, such as increased knowledge or information base, comfort, competitiveness, product quality, or energy affordability.	Attachment B-1

ASHRAE 211-2018 LEVEL 2 ENERGY AUDIT		NYSERDA FlexTech PON 4192		
EEM Summary	Reference	Evaluated Measures Findings / Supporting Documentation	Reference	
Distributed / Renewable Energy Resources (DER / RER) - The results of the preliminary DER/RER opportunity assessment shall be reported. The assessment shall include an estimate of the system size, savings, cost, and simple payback. Where a technology is judged to be not feasible, this shall be stated along with the reason for such finding. - The energy audit report shall indicate that a Level 3 energy audit may be conducted to more fully determine system sizing and configuration, energy and cost savings, and cost estimates.	6.2.4.3 & Appendix D (Outline Section 5)	Evaluated Measure Findings: Provide a description of the evaluated measures, such as what was evaluated, analysis results, proposed conditions, and recommendations. - Include reasons for recommendations on all energy efficiency measures and capital improvements. - For measures that were evaluated and not recommended, provide narrative as to why the measure was not recommended. - Energy cost savings should be calculated using		
EEMs Considered but not Recommended. - List the energy saving opportunities considered but not recommended, along with the reason for not recommending the measure. - List considerations that might change in the future that would then justify recommending implementation.	6.2.4.4 & Appendix D (Outline Section 5)	 building specific utility rates and should take into account both energy consumption rates and demand rate(s) (Marginal Utility Rate Analysis). Maintenance cost estimates should be included for each evaluated measure. Maintenance costs should include preventive maintenance, repair and other general maintenance costs required to keep equipment operational. Additional benefits: Reports should strive to include information on additional potential project benefits, such as increased productivity, job creation or retention, greenhouse gas reduction, or environmental benefits. Include as a qualitative description of other project benefits, such as increased knowledge or information base, comfort, competitiveness, product quality, or energy affordability. 	Attachment B-1	
EEM Cost Estimate Reporting	Reference	Economic Analysis	Reference	
 For each practical measure, include built-up cost estimates and assumptions. Identify hazardous materials if possibly present as a potential impact on measure cost estimates. 	6.2.5 & Appendix D (Outline Section 6)			
EEM Economic Analysis Reporting	Reference	Economic analysis: Provide thorough economic evaluation to include, at minimum, all parameters		
- For each practical measure, report the simple payback and simple ROI and the ancillary quantifiable factors. Include a description of the nonquantifiable factors and an indication of whether a given practical measure is recommended for implementation. - Report aggregate simple payback and simple ROI of all recommended measures inclusive of interactive effects.	6.2.6 & Appendix D (Outline Section 7)	required for simple payback analysis. Life-cycle cost or other more detailed analyses (e.g. ROI, IRR, etc.) may also be included, if desired or if required by the Scope of Work.	Attachment B-1	

ASHRAE 211-2018 LEVEL 2 ENERGY AUDIT		NYSERDA FlexTech PON 4192	
Quality Assurance Reporting	Reference	Supporting Documentation	Reference
- Tabulated utility data (Appendix C tables). - Utility rate schedules (Appendix C tables). - Calculation methodology. - Savings calculations. - Cost estimates.		Energy or carbon savings calculations evaluated, including: - Clearly demonstrated assumptions based on anticipated changes to the system or equipment being evaluated must be provided. - Clearly stated conversion factors must be provided. - Energy and carbon savings calculations must be presented as savings at the customer's utility meter(s), and not at the individual building or tenant space. For example, self-generated steam or chilled water savings should be reported back to the source of generation (i.e. natural gas). - Measured data logs with accurate units of measure and indication of the measured data source(s), where appropriate. - Itemized project implementation cost estimates (at minimum material and labor costs associated with each measure). - Sources of cost estimates and/or vendor quotes, as applicable. For projects where computer modeling is used, reports must also include: 1. Brief presentation of the manipulations which the software program performed (e.g. utility bill calibration and accuracy level). 2. Input data for the building and for each EEM should be presented in a manner which allows easy identification of input parameters. 3. Output data from model with clear and precise presentation of the results in both tabular and narrative forms.	Attachment B-1
- Operations and maintenance (O&M) logs Equipment specifications.		Retro-Commissioning (if part of Scope)	Reference
		For projects that include RCx, reports must also include: 1. Final current facilities requirement (CFR) document that includes: a.) Setpoints – heating and cooling. b.) Setpoints – occupied and unoccupied. c.) Ventilation. d.) Schedule. e.) Space pressurization. f.) Expected occupancy. g.) Filtration requirements. 2. A description of all existing building systems included in the RCx effort, including but not limited to: a.) Basic control ideology for each individual system. b.) Distribution system design. c.) Design and/or tested flow rates. d.) Known issues at the project start. 3. All forms (pre and post) for tested deficiencies that demonstrate methodology and completeness of the testing. 4. Each deficiency must also be included on the required Project Summary Sheet.	Attachment B-1

ASHRAE 211-2018 LEVEL 2 ENERGY A	UDIT	NYSERDA FlexTech PON 4192	
Compliance Form	Reference	Compliance Form	Reference
Compliance Form Includes the Following: - Building Information (Name, Address, Owner/Representative). - Qualified Energy Auditor Information (Name, Address, Certification). - Completion checks (Preliminary End Use Analysis, Section 5, Section 6). - Audit Completion Dates. - Signature (Auditor, Authority Having Jurisdiction).	Appendix A	n/a	n/a
Energy Savings Calculations	Reference	Project Results / Supporting Documentation	Reference
Energy and Cost Savings Calculations shall be prepared and documented to show: - Procedures / Methodology. - Building Data / Variables. - Existing Conditions. - Major Assumptions. - Ancillary (nonenergy related) Impacts relevant to decision makers. - Quantifiable non-energy impacts: report in form L2-EEM Summary Table (Reporting Forms in Appendix C). - Small / inestimable non-energy impacts: summarize in the EEM description. For each EEM, calculations shall one or a combination of the forms: - Full Measure Calculation including interactive effects. - Spreadsheets showing data inputs, constants, variables, and results. Not all formulaic cell definitions must be shown, but a locked spreadsheet record shall be maintained for review if requested. - Energy Modeling including copies of inputs and key outputs for the base case and successive runs. - Other Software calculators including software name and version and copies of inputs and key outputs for the base case and successive runs.	Appendix B	Energy or carbon savings calculations evaluated, including: - Clearly demonstrated assumptions based on anticipated changes to the system or equipment being evaluated must be provided. - Clearly stated conversion factors must be provided. - Energy and carbon savings calculations must be presented as savings at the customer's utility meter(s), and not at the individual building or tenant space. For example, self-generated steam or chilled water savings should be reported back to the source of generation (i.e. natural gas). - Itemized project implementation cost estimates (at minimum material and labor costs associated with each measure). - Sources of cost estimates and/or vendor quotes, as applicable. For projects where computer modeling is used, reports must also include: 1. Brief presentation of the manipulations which the software program performed (e.g. utility bill calibration and accuracy level). 2. Input data for the building and for each EEM should be presented in a manner which allows easy identification of input parameters. 3. Output data from model with clear and precise presentation of the results in both tabular and narrative forms. 4. Verification that interactive effects were taken into account. Additional benefits: Reports should strive to include information on additional potential project benefits, such as increased productivity, job creation or retention, greenhouse gas reduction, or environmental benefits. Include as a qualitative description of other project benefits, such as increased knowledge or information base, comfort, competitiveness, product quality, or energy affordability.	Attachment B-1

ASHRAE 211-2018 LEVEL 2 ENERGY AUDIT		NYSERDA FlexTech PON 4192		
Reporting Forms	Reference	Project Summary Sheet	Reference	
Reporting Form includes the following: -Building Characteristics: - Name, Address, Year Constructed, Gross Floor Area, Space Breakdown, Occupancy, Envelope, HVAC, Equipment, Lighting, etc Energy Use: - Utilities IDs, 12 Months Data (Consumption & Cost), Energy Use Intensity, End Use Breakdown Recommended Energy Efficiency Measures: - Low-Cost & Capital Measures: (Recommendation, Modified System, Impact, Cost, Savings, ROI, Priority) Asset Score Inputs (Optional): - Surface Area, Orientation QA-QC: - Savings < Consumption, Interactivity. Auditors may use the form located at www.ashrae.org/211-2018 or a comparable standard electronic format approved by the authority having jurisdiction.	Appendix C	Project Summary Sheet: The content in this summary table is required in all project reports (see Attachment B-2). The table provides an overview of the project metrics by identifying the following metrics by measure: payback, cost, and savings in dollars, MMBtus, kWh, kW (where appropriate), current energy consumption at the facility, utility costs/rates used in the analysis and the status of each evaluated measure.	Attachment B-1	

If you have questions or need support, reach out to flextech@nyserda.ny.gov.

