

Town of Madison – TA Study Proposal

To: Woodie Weiss, Town of Madison,
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From: Satyen Moray (ERS)

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INTRODUCTION

ERS is pleased to submit a revised TA study proposal based on discussions with Woodie Weiss to conduct ASHRAE Level 2 energy audits at the following facilities that were selected by the Town of Madison staff –

- Daniel Hand High School – 205,000 ft²
- Brown Middle School – 107,000 ft²
- Polson Middle School – 150,000 ft²

Scope of Work

Please note that the overall scope of this effort will be to assess operations of all energy using systems at these schools with a minor variation in the focus of our effort. Based on our discussion with Woodie Weiss, the Town would like to focus most of the effort on assessing the equipment operations contributing to facility peak demand and on HVAC system operations. Therefore, to meet the Town's requirements and to do our due diligence, after surveying the various energy systems, our primary focus would be to delve into the peak demand and BMS controls related topics for these schools.

As a part of these audits, we will conduct the following tasks to meet the Town and ASHRAE Level 2 audit requirements:

- 1) Review historical electrical and fuel use data (minimum of 1 year, ideally up to 3 years of continuous data), develop weather normalized electric and fuel consumption for the schools, and develop a benchmark (energy use intensity) for the school buildings using a number of relevant available resources (U.S. DOE's Commercial Building Energy Consumption (CBECS) data, ASHRAE/ANSI/IES standard 100-2018). Please note that for the schools with on-site PV, we will include the energy generated and consumed by the on-site PV systems in the site energy intensity calculations. The exported PV energy will not be included in the site energy intensity calculations.
- 2) Review interval meter data from the recent 12-month period to determine when the peak demand is typically set and to also determine the nighttime loads.

- 3) Where available, we will review as-built architectural, electrical, mechanical and plumbing drawings, previous energy audits, testing/air balancing reports for our review prior to the site visits.
- 4) During the site visit, we will survey at least 10-20% of the classrooms (assuming that they are identical) and 100% of all unique space types (gymnasiums, cafeteria, library, kitchen, makers spaces, etc) and inventory the energy using systems (lights, computers, smart boards, cooking equipment, refrigeration, kitchen hoods etc) in these spaces.
- 5) We will also determine how the various energy systems are currently controlled in the various spaces that we survey. We will also inventory the major HVAC systems in the mechanical rooms and interview the site/town staff about their O&M practices/systems. We will also inquire about any special concerns/issues associated with the HVAC system operations or persistent complaints from building occupants. We will also interview site staff for equipment and school schedules/setpoints. We will also survey the existing building management system (BMS) and its capabilities. We will also interview the site staff on their knowledge/ability to adjust setpoints in the BMS.
- 6) Based on our discussion with Woodie Weiss, we plan to deploy various types of data loggers on major HVAC equipment over a period 4-8 weeks during this summer. We will deploy temperature, humidity, carbon dioxide, and current draw type loggers in a variety of spaces. The current draw logging will mostly involve equipment such as rooftop units, fan coil units, and potentially lighting circuits (if on few panels) with intent of developing equipment profiles and developing ideas/suggestions to potentially offset peak demand due to simultaneous start of HVAC equipment.
- 7) Based on our site survey findings, we will develop a targeted list of no-cost/low-cost measures and capital measures. We will develop independent measure level analyses using excel spreadsheet models of the schools. Measure costs will be developed based on discussions with site staff, RS Means and our engineering judgement.
- 8) The final step will involve the development of an independent TA study report for each school building that will document our findings and will include information about the school, its schedule, present historical energy use information, present an end use breakdown of the fuel systems, provide a brief description of the energy using systems, end use breakdown pie chart and identify opportunities ranging from low-cost/no-cost in nature to capital intensive opportunities. For each of the identified opportunities, we will present the associated peak demand and annual energy and cost savings along with an estimate of the required investment and the associated simple payback. This information will be presented in compliance with the requirements of the EnergizeCT programs.

Budget

The proposed ASHRAE Level 2 TA study budget for the three schools selected by the Town of Madison is presented in Table 1. Please note that the TA study cost totals **do not include cost share available from Eversource Energy and Southern Connecticut Gas.**

Table 1. Proposed TA Study Budget

School	Budget
Daniel Hand High School	\$17,500
Brown Middle School	\$10,000
Polson Middle School	\$11,000
Total	\$38,500