Hollis School Board
Energy Study Working Group
Meeting Minutes
Monday, September 19, 2016
Hollis Upper Elementary School

In Attendance:

Hollis School Board - Rob Mann (by phone), Michelle St. John, Tammy Fareed
Hollis Energy Committee - Woody Hayes
Consultants to ESWG - Charlie Niebling, Dick Henry

The meeting was called to order at 6:43pm. Before the commencing with the Agenda, Dick Henry asked to take the group on a brief tour of two spaces in the building to see lighting renovations. The school conference room has been fitted with LED "soft white" lamps in place of the standard fluorescent tubes; principal Candi Fowler's office has been fitted with LED "daylight" lamps. Members commented on the improved light quality. Dick pointed out that the tubes use approximately half the energy of standard T8 fluorescent tubes, give off more lumens per tube, and last 50,000 to 75,000 hours, resulting in significant savings in replacement costs and maintenance time. Each tube costs approximately $10, compared to a standard fluorescent tube cost of $1.50 per tube, but LED tubes last many times longer such that their estimated 'payback' is less than two years, and the savings accruing beyond that period could help pay for other efficiency improvements. Dick explained that HUES head custodian Ed Hinckley had decided to install these lamps from within his operating budget to determine if staff members like them, and reports that responses have been positive.

Charlie Niebling reviewed the scope of the Energy project, including the study objectives, overall timeline and deliverables. He emphasized that the coming weeks will see a period of intensive work, culminating in the Public Forum where data and system options would be presented. Personal and town calendars were checked again, and it was determined that the Public Forum will be scheduled on Thursday, October 27, 6:30 p.m. – 8:30 p.m. The preferred location is the Town Hall Community Room; if that is not available, the Forum should be held at the HPS library because the acoustics are better than at HUES, and the committee would be able to point out some of the conditions requiring amendment on site.

Charlie and Dick proceeded with their reports:

<u>Work completed since July 2016</u>

- Finalized contract with Hollis School Board
- Photovoltaic solar planning, tour of school grounds with ESWG 7/11/16
- Approved scopes of work for subcontractors
- Hired John F. Penney Consulting Services (Mechanical Engineer) and Resilient Buildings Group (building performance experts): Tech Team

- Outreach to prospective vendors, review and approval of vendor list
- Helped coordinate Air Source Heat Pump (ASHP) pilot study for HPS library
- Tech. Team building tour with SAU staff August 24
- Heat load modeling – John Penney
- Cost estimating for key building system upgrades
- Plan monitoring of buildings, tour with administrators and Ed Hinckley, RBG Sept. 9
- Install monitors for ASHP performance at HUES and Library at HPS Sept. 16

Finalizing the contract required months of revisions of the draft to meet the objectives desired by members of the Hollis Energy Committee (HEC), the Hollis School Board (HSB), and the Hollis Budget Committee.

Touring the grounds between both buildings, ESWG members showed Dick the site they had chosen to place a 100KW photovoltaic solar panel 'test bed'. An area between HPS and the power line easement was identified as being a very strong candidate. Woody Hayes stated that he and Paul Happy are working with Venu Rao to create a pilot study plan that they feel confident will make a strong case for incorporating solar.

Regarding the subcontractors, Charlie and Dick have had several meetings with them and have received some preliminary information back. They commented that they are impressed with the subcontractors' work to date and expect significant value from their final work products. For example, John Penney worked with building and SAU staff to arrange the transfer of 100s of gigabytes worth of scanned blueprints of both buildings to create precise answers for very technical questions. Dick complimented building staff for the resourcefulness and commitment to locate the drawings and work out the transfer.

Regarding the ASHP pilot project in the HPS library, Charlie reminded that Andy has committed to funding it from within district operating budgets. Rob commented that Andy's support for any expenditure is hard-won, so his support of this pilot is a vote of confidence in the value it could add to the building on its own merits.

Dick described some of his work to date with RGB. Together they worked with head HUES custodian Ed Hinckley to establish sites around both buildings to install sensors to gather climate information. Some are set above and below ceilings in the same location in order to see how the ceilings are performing. At HUES sites were selected to distinguish south-facing from north-facing building performance, along with other metrics. Data will begin to accumulate in a couple of weeks. These tests will help determine placement of Phase Change Material to test its performance on site. RGB is scheduled to return to the buildings soon to do "blower door tests" on the windows at HPS. This will reveal to what degree the windows are air tight. If significant leaks are detected, a theatrical-smoke test will be used to help measure and demonstrate the extent of leaks.

Discussion moved on to the work plan leading to the October Public Forum. By the end of September, the subcontractors are expected to complete their heat load modeling report of efficiency measures as well as a report on preliminary costing information of efficiency measures and other building system upgrades. Also expected by the end of the month is a finalized heating system Requirements Document; this document will be used to describe current building demands and demand under various efficiency modifications. Vendors will be invited to carry out site visits within a two-week window ending around October 10 to evaluate the project. They will utilize the requirements document to develop their estimates. Dick stated he has already begun gathering some vendor costs, and expects complete estimates should be available by mid-October. A payback analysis of the various project scenarios is planned in time for a late-October ESWG meeting to be scheduled very soon, as is a draft of the full public presentation and a report summarizing financing options including grants, bonds, rebates, etc.

Charlie stated that the October Public Forum is intended to gather further input. The information presented at the event will be a starting point for the public to comment on and add guidance to the direction of the project. It is expected that input at the Public Forum and in the days that follow will guide the ESWG's refinement of the study and ultimate recommendations in December.

Charlie and Dick generally touched on preliminary project alternatives at each school, including baseline oil/propane, centralized or localized wood boiler plants, ground and air source heat pump systems, and solar. They mentioned distribution system challenges, building management system challenges, and shell improvement alternatives. Dick reminded the group that any HPS electrical system upgrades are not within the scope of the study, but could become an issue if ASHP turns out to be the preferred system for that building. Tammy confirmed that Andy had mentioned the electrical system at the September meeting of the Hollis School Board thanks to ESWG member Mike Leavitt who had done a basic analysis of the power being fed into HPS and the power availability within the school under current building use.

Dick went on to describe two significant system concerns discovered thus far in the buildings. The air handling system at HPS was installed in 1999, and is highly inefficient and very expensive to run. Utilizing heat from boilers, it heats incoming air from the outdoors to warm the building and then vents 100% of that warmed air back outdoors. According to the AEC Audit this system accounts for approximately 20% of the HPS electric bill. He could not emphasize strongly enough the resulting amount of wasted dollars, as well as the undue burden it places on the boiler system. In its place he envisions an air handling system that effectively and efficiently recycles the heated air as well as extracts heat from the portion of that air that is released to the outdoors. He stated that such systems reduce operating costs substantially and improve air quality, so that if we can correct this problem, both heating and electrical costs for the HPS will be a lower proportion of the total energy bill each year. At HUES, it has been found that the Munters dehumidifying unit is not being efficiently utilized and is being over-taxed. It was installed in response to the mold crisis in 2009 to eliminate the risk of mold growth in the building. Dick stated that Ed Hinckley mentioned that the walls at

HUES tend to be moist enough in the shoulder months of the year so that it is difficult to stick posters and such to the them. Dick notes that this suggests the potential for a new mold problem is an under-recognized concern. He and subcontractor John Penney speculate that the problem results from the interplay between inadequate insulation and the way the building is set into the hillside. The Munters unit is currently only treating the bottom-most floor of the building. Dick has some ideas for modifications that might allow the system to potentially treat other floors of the building effectively using the same amount of energy or possibly less. He will present these ideas at the next ESWG meeting.

Woody Hayes reported that he is working with committee members Venu Rao and Paul Happy on a requirements document for the solar photovoltaic project. The goal is to study the feasibility of installing a 100KW "test bed" in the wooded area between HPS and the power line easement between the schools to demonstrate how such an installation can be invisible from the town's streets while creating substantial energy savings. Their draft presentation should be ready by the next ESWG meeting to prepare for the Public Forum.

Dick remarked that the investments being studied can be expected to extend the working life of the school buildings for another thirty years. Rob remarked that this is a significant benefit that should not be underestimated.

Rob commented that he feels enthusiastic about the options being studied, and optimistic that the committee will be able to develop an elegant blend of components that will be very effective for the district.

The meeting adjourned at 8:32 p.m.