

Dear School Committee and Energy Committee members,

On 23 July a team from Eastern Building Performance conducted an commercial-grade energy audit at Shead High School. The purpose was to understand the buildings as an integrated system (insulation, heating fuels, mechanicals, distribution, control) and to identify potential savings in relation to future investments.

It is useful to note that heating season costs are high and rising at Shead High School while occupancy levels remain stable. Here are the heating fuel consumption figures for the last three winters:

winter '10-'11: 10,578 gal #2 oil \$28,067

winter '11-'12: 11,712 gal #2 oil \$38,767

winter '12-'13: 13,194 gal #2 oil \$43,672

3 winter total: 35,484 gal #2 oil \$110,505

So even a modest efficiency improvement of, say, 15% would result in \$16,575 in savings over three years. It is likely that potential efficiency improvements are greater than 15%.

Attached is the audit report, preceded by a memo from me summarizing their findings.

The seven key conclusions, as I read them, are:

There is little opportunity to improve the insulation levels of the building, since no wall or ceiling cavities exist and the expense of adding a layer throughout would far outweigh the associated savings (although adding insulation during a routine roof replacement is recommended).

There is little opportunity to change the type of heating fuel used to support the hydronic radiant system in the main school building, since bulk fuel storage would require new construction and, as above, the expense of these interventions would outweigh the associated savings (although augmenting the oil-fired radiant system with mini split heat pumps may be a good option, and is address in some detail in the audit report.)

There are few advantages to be gained by replacing windows, which is an expensive undertaking with low efficiency gains. The existing shortcomings of the windows during the winter season (cold air and moisture infiltration) can be addressed with interior temporary storm window inserts at a much lower cost.

The unit ventilators used to heat classrooms can be retained to advantage if their controls – and especially their automatic air dampers controlling flow of outside air – are properly repaired and adjusted, and that the staff is trained to use them efficiently.

The existing heating system's high fuel consumption pattern could be improved by installation of auxiliary heat pump units in those spaces that have highest use and occupancy through the winter. These units convert energy into useful heat much more efficiently, take load off the main system, and provide backup heat in case the main system fails temporarily.

The steam boiler supporting the gymnasium could be converted to an oil-fired unit compatible with the boilers supporting the main school building, increasing efficiency and simplifying maintenance. At the same time, surplus heat in the boiler room could be captured and recycled with a heat pump serving the locker rooms.

In relation to audit recommendations #3-6 above, it would be useful to obtain real world estimates from qualified local contractors in order to estimate the relationship of investment costs to anticipated savings. The Affordable Heat Consortium is ready to assist in this process at the request of the School Committee.

If you have any questions about this audit report, its recommendations, or its implications, I would be happy to answer them if I can. If you would like to discuss next steps in relation to these findings, it would be easy to arrange a dedicated meeting for this purpose.

Cordially,

Jon

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