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PDT Architects
Susan Ransom, marketing director, 207-775-1059

Facts about the Gorham Middle School Geothermal Heating and Cooling System

1. It is very difficult to find an apples/apples comparison among mechanical systems. Building energy efficiency is a constantly moving target. The geothermal heating and cooling system at Gorham Middle School was designed in 2001, and the building occupied in 2003-2004. The system should therefore be compared to systems of similar vintage in other middle schools that are 100% air conditioned. In addition, 2001 projections were based on \$1.80/gallon oil prices, which are now, to put it mildly, obsolete.

2. See *Gorham Middle School: Independent Evaluation of Geothermal HVAC System* (attached). According to this independent report, commissioned in 2006 by the Maine Department of Education, the Gorham Middle School has a very efficient heating and cooling system that saves the taxpayers money over a conventional system. Pages 7 and 8 go into actual cost savings over various kinds of schools and mechanical systems.

To quote the conclusions from the report: "If considered in terms of annual energy cost, . . . GMS . . . out performs existing schools by a wide margin and surpasses the average projections for new "high performance" schools by a smaller margin. The bottom line is, GMS is a very energy efficient facility."

3. See *Sample of Maine Schools Annual Energy Use Worksheet* (attached, Whitney Engineering). According to that comparison, in 2007-2008 the system at Gorham Middle School saved taxpayers \$28,607 over an average of Maine middle schools that were heated and air-conditioned. That average is based on only two other middle schools besides Gorham, because they were at the time the only others with 100% air conditioning.

4. Comparisons of energy use between middle schools and elementary schools are lopsided. Middle schools tend to use more energy than elementary schools. Middle schools are generally used for more hours of the day and have larger spaces (GMS has a high-school-sized gymnasium, locker rooms, and a 400-seat auditorium).

5. Geothermal systems are year-round heating and cooling systems, not just heating systems. Costs should be compared to other schools that are both heated and air-conditioned. Because air conditioning is included, these buildings are far more usable by the community year-round.

6. Geothermal heat pump systems work by extracting heat from the ground and concentrating it with heat pumps. Heat pumps are used to "boost" the heat to comfortable indoor temperatures. The use of electricity instead of oil does provide some stability to utility cost fluctuations, as electric rates are somewhat insulated from world events. This safe technology is used around the world, resulting in lower fossil fuel use and lower heating and cooling costs for the consumer.

7. Comparing the efficiency rates of different kinds of mechanical systems and different fuels is a large public policy issue. Costs for the energy efficiencies of different fuels are figured by the utility company into its bills. Geothermal heating and cooling systems result in lower overall utility bills to the consumer, even after those inefficiencies have been factored in.

8. Geothermal heat pump systems also greatly reduce greenhouse gas emissions and local air pollution.

9. Energy efficiency for schools is evolving at lightspeed. Gorham Middle School was a state-of-the-art middle school when it was designed in 2001, and it was the first public school in Maine to be 100% heated and cooled with a geothermal heat pump system. Both Gorham Elementary School and Brunswick Elementary School, currently in design, are Maine High Performance Schools that will incorporate more efficient technologies. Both will participate in the Efficiency Maine High Performance Schools Program, and Brunswick Elementary School is planned to be certified in the LEED for Schools Program.

10. Both GES and BES will have on-demand ventilation and state-of-the-art heat recovery systems, which GMS does not have. The GES and BES systems will use CO₂ sensors to maximize fresh air while minimizing ventilation equipment "run" times. On-demand ventilation, heat recovery systems, and other new technologies should result in more efficient systems and further cost savings to the taxpayer.