

Impacts on People:

We will hear tonight about the costs and benefits of using green technology in construction. There are costs to this investment, however balancing against that are the immense benefits to providing a healthy environment for people who live, work or attend school in these buildings. The hallmarks of green construction, also known as high performance buildings, are improvements to: 1. Air Quality, 2. Temperature control, 3. Lighting, and 4. Acoustics. These improvements translate into positive financial impacts in the form of higher test scores, which in turn predict higher future earnings for our students; decreased incidence of asthma, colds and influenza, and the negative economic impacts of these illnesses on families in our community; and improved teacher and employee retention.

Studies have documented that there is a relationship between improved air quality and health. Air quality problems can be caused by poorly maintained or degraded air ventilation systems, poor control over pollutants such as cleaning materials and integrated pest management, and use of furniture, rugs and construction materials which emit off-gases called volatile organic compounds (VOCs), which can trigger serious illnesses, including asthma. Children in particular are at a greater risk of developing health problems due to poor indoor air quality than adults because they are still growing and their

organs are still developing, and they breathe more air in relative to their body size than adults. Air quality problems can be addressed by the selection of low-emitting, non-toxic products and materials whenever possible, installation of HVAC systems (for heating, ventilation and air-conditioning) which are easy to control and maintain, and scheduling cleaning and maintenance activities during off hours whenever possible.

A number of studies have found a significant positive correlation between student achievement and temperatures falling within the human comfort zone. The best teachers emphasize that their ability to control temperature in their classrooms as very important to student performance. High performance construction ties the HVAC system into the design of the building so it is easy to control and maintain.

Daylighting is a central component of high performance design. Providing natural daylight provides natural stimulation for hormones that regulate body systems and moods, provide opportunities for natural ventilation, and reduce the need for artificial light thereby reducing energy costs. Studies have found that students with the most classroom daylight progressed 20% faster in one year on math tests and 26% faster on reading tests than those students who learned in environments that received the least amount of natural light.

And finally, high performance buildings use various construction and design methods to improve the acoustical environment, including HVAC systems with little or no noise, increasing the amount of exterior glazing, and consideration of external noise factors like traffic. Research indicates that students do not learn when they cannot hear well, and that there is a positive correlation between appropriate acoustical conditions and student achievement.

With these four green building design considerations, students learn faster, and a conservative estimate has found that test scores on average for students increase between 3% and 5%. Faster learning and higher test scores are significantly associated with higher lifetime earnings.

There are also the financial benefits to the reduction of asthma, colds and influenza. Asthma is a widespread and worsening disease among children. American children miss more than 14 million school days a year because of asthma exacerbated by poor indoor air quality. It costs nearly 3 times as much to provide healthcare to a child with asthma than without. A recent review of five separate studies has found that in buildings with improved air quality, there is an average 39% reduction in asthma. Improved ventilation and air quality reduces a range of respiratory illnesses, including the

common cold and influenza. Studies have found an average 51% reduction of incidents of cold and flu in buildings with improved air quality. When adults miss a work day, or children are home sick from school, thereby causing a working parent to stay at home or pay for child care, it is economically disruptive. And finally, studies have found that school facility quality has a significant impact on teacher retention. The cost of employee turnover is estimated at 25% to 200% of annual salary plus benefits, including the cost of termination, hiring and loss of learning.

Green construction can translate into higher test scores, decreased incidence of disease, and improved teacher and employee retention.