

INTRODUCTION:

- Name
- School Name
- School Location

BUILDING DESIGN SUMMARY:

- School Philosophy
- Sustainable Highlights
 - 79,000 Gallon Cistern
 - Natural Daylighting Design
 - Light tubes
 - Sloped ceilings in exterior zones
 - Virtually eliminate artificial lighting on bright sunny days
 - Recycled Airplane Tire Floors
 - Non-Toxic Adhesives
 - Occupancy Sensors and Light Meters
 - Non-Automated Natural Ventilation System
 - Was one of my breadths, Chose not to present
- 123,000 SF
- 825 Students
- 73 Staff
- Zones

OPTIMIZATION INVESTIGATION:

- Zones Separated by AHU's which provide ventilation to the occupied spaces in the building
- Air is then distributed to multiple GSHPs in each zone to maintain proper thermal comfort
- Removal of Sensible Wheels
 - Benefits of a decreased associated pressure drop over the wheel would be greater than the detrimental loss of free reheat
- Smaller total package
 - Lower first cost
 - Decreased total weight, structural implications

SYSTEM ALTERATION:

- Decreased fan usage by around 19% total
- Decreased fan capacity by 30%
- Increased required OAU capacity ☹
- Decreased overall system thermal capacity by over 4%
- GSHP alignment from series to parallel

OPTIMIZATION INVESTIGATION:

- Although the overall system thermal capacity was decreased by over 4%, a large percentage of that capacity was switched from the high efficiency GSHP system to the lower efficiency air cooled OAU system.
- This raised a red flag, so coupling the OAU's with the existing ground loop was investigated.

SYSTEM ALTERATION:

- 21 wells needed to be added
- Cost
- Capacity
- Monthly Savings
- Simple Payback

OPTIMIZATION INVESTIGATION:

- There is a growing population of young engineers who view the specification of photovoltaic cells as an option that is utilized to attract public attention more so than to efficiently and effectively create energy for a building within reasonable financial boundaries.
- I set out to prove this wrong

SYSTEM ALTERATION:

- BP 3230 T
 - Longevity and resistance to degradation
 - High Relative Efficiency of 13.8%
 - Fantastic Part Load Efficiency of 13.1% (95% of max efficiency)
 - Brand Name
- Optimal Array Size
- First Cost
- Tax Credit
- Net Cost of \$224,000
- Simple Payback

CONCLUSION:

Manassas Park Elementary School was originally designed to change the way things are done in elementary school construction in Northern Virginia. It used a fine selection of systems along with progressive green architecture to achieve a relatively low-energy, high-efficiency LEED® Gold building. With all of the positives that go along with a well-designed building, this study was fairly difficult to compile. However, sustained investigation of the existing systems brought to light some of the design choices that may have kept the design team from reaching the full potential of Manassas Park Elementary School. These choices made by the design team were most likely the result of time pressures

brought about by the project schedule and/or differences in opinion between different sectors within the design team. As has been shown time and time again, a truly integrated design team is an extremely hard feat to achieve. However, the design team of Manassas Park Elementary School proved that if a design team truly can come together, they can create truly fantastic buildings.