



TAD EVERETT

SUPERINTENDENT OF SCHOOLS

SCOTT JOHNSON

ARCHITECT, RLJA INC.



STERLING PUBLIC SCHOOLS

5 PARTS OF THIS PRESENTATION

- 1. WHAT IS GEOTHERMAL?**
- 2. HOW DOES GEOTHERMAL WORK,
AND WHAT DOES IT LOOK LIKE?**
- 3. WHAT ARE THE BENEFITS OF
GEOTHERMAL?**
- 4. WHAT ARE TYPICAL INSTALLATION
COSTS?**
- 5. WHAT ARE POSSIBLE FUNDING
SOURCES?**



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PART #1

WHAT

IS

GEO THERMAL?



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WHAT IS GEOTHERMAL?

**WE'RE NOT EXTRACTING, OR
PRODUCING, ANY ENERGY.**

**IN GEOTHERMAL HEATING &
COOLING SYSTEMS, THE EARTH'S
NATURAL TEMPERATURE IS USED TO
HEAT OR COOL "WATER."**

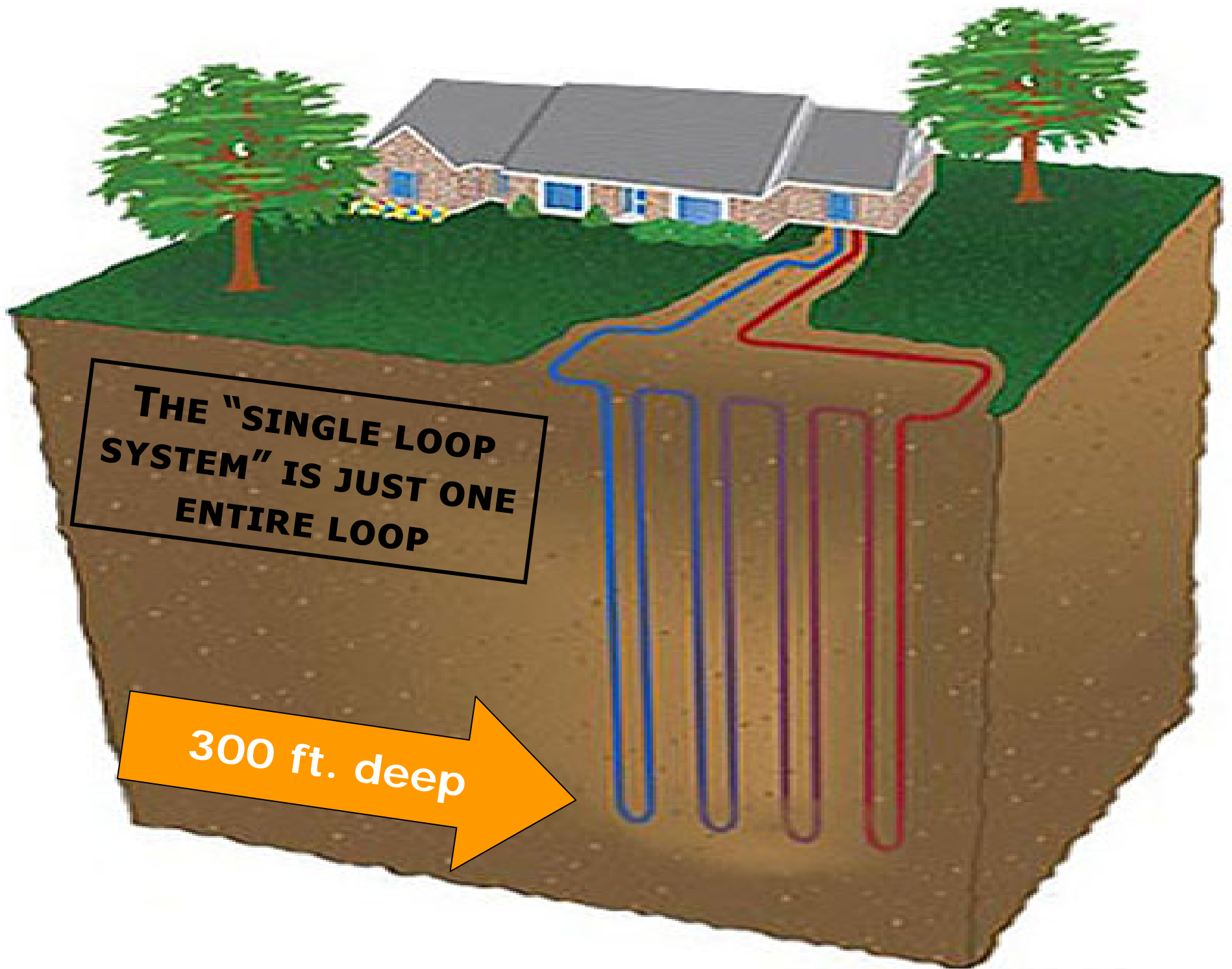


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WHAT IS GEOTHERMAL?

- THAT WATER IS PUMPED THROUGH AN UNDERGROUND “LOOP” OF PIPES THAT IS KNOWN AS A WELL-FIELD.**

- THE FOLLOWING GRAPHIC DEPICTS A “LOOP.”**





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WHAT IS GEOTHERMAL?

- WE HAVE A "ONE-LOOP SYSTEM"**
- AS THE WATER GOES THRU THE WELL-FIELD IT IS COOLED OR HEATED BY THE TEMPERATURE OF THE EARTH**
- OUR WATER COMES OUT OF THE WELL FIELD BETWEEN 40 TO 80 DEGREES**



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PART - #2

**HOW DOES
GEOTHERMAL WORK,
AND WHAT DOES IT
LOOK LIKE?**



**STARTING THE PROCESS: THE WELL FIELD
DESIGNED IN ROWS, 20 FT. CENTERS**



**SPS AVERAGED APPROXIMATELY
3 WELLS EACH DAY**



**PLEASE UNDERSTAND THIS
IS A VERY MESSY PROCESS**



THAT KEEPS GETTING MORE AND MORE . . .



MESSY!



IT CAN ALSO BE NOISY AT TIMES



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HOW DOES GEOTHERMAL WORK?



**DROPPING
THE
LOOP**



A GROUTED WELL



AFTER DRILLING THE WELLS, BEFORE LANDSCAPING



PREPARED FOR LANDSCAPING, AND GPS LOCATORS



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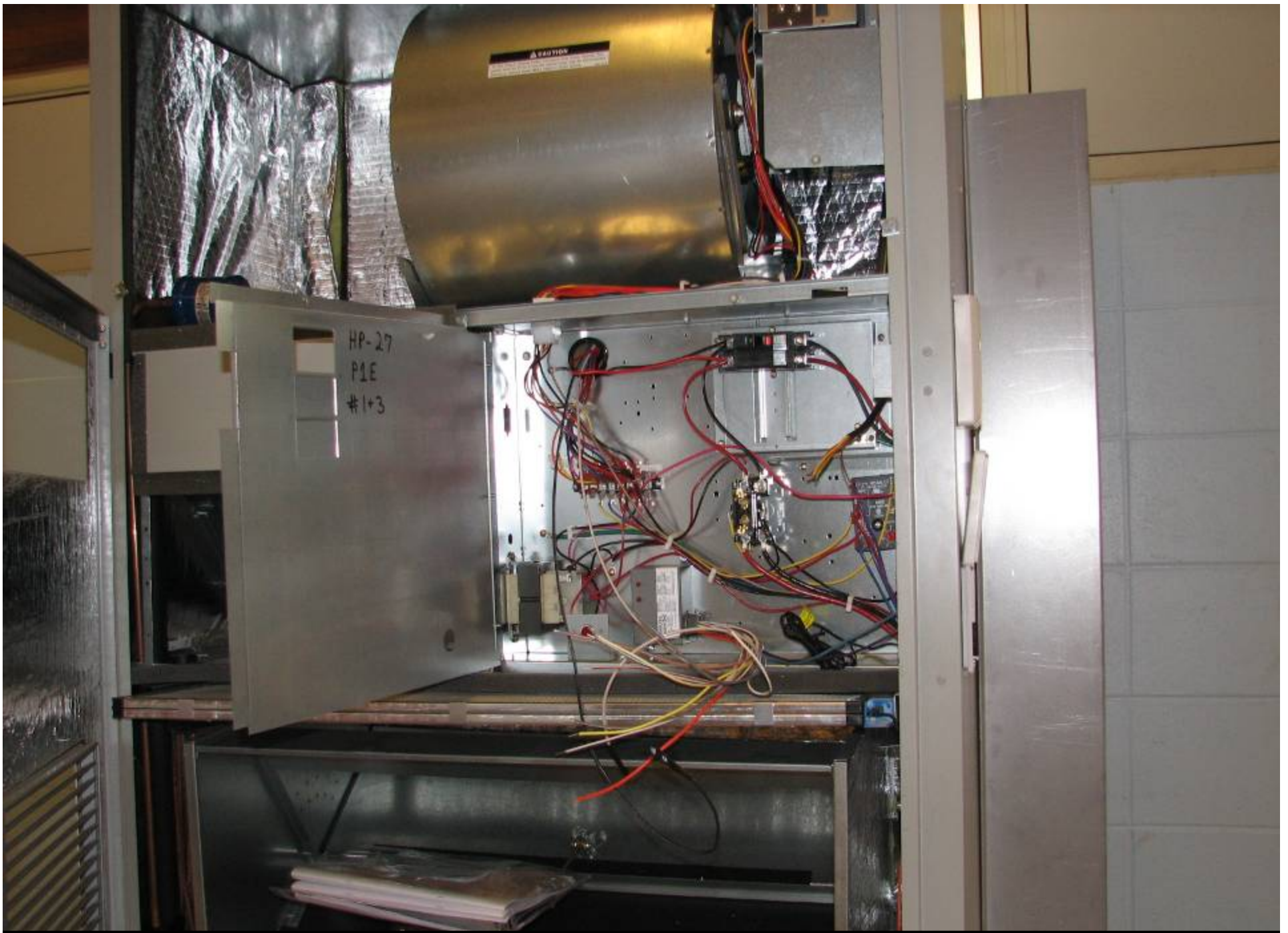
HOW DOES GEOTHERMAL WORK?

- **THIS WATER IS PUMPED THRU THE ENTIRE "LOOP"**

- **A PIPING SYSTEM THEN PUMPS WATER TO A CLASSROOM UNIT REFERRED TO AS A HEAT PUMP**
 - **THIS IS USED TO HEAT AND COOL EACH ROOM**



THE INTERIOR PIPING CAN BE VISIBLE OR HIDDEN



THIS IS A HEAT PUMP



A FINISHED HEAT PUMP



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PART #3

**WHAT ARE THE
BENEFITS OF
GEOTHERMAL?**



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BENEFIT #1

**WE IMPROVED
THE
LEARNING
AND
TEACHING
ENVIRONMENT**





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HOW WE IMPROVED ENVIRONMENT

□ AIR-CONDITIONING

□ IONIC AIR-FILTRATION SYSTEM

**□ EVIDENCE IS INCREASED
ATTENDANCE RATES AT FRANKLIN
AND JEFFERSON**



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ATTENDANCE RATES

School	FY09	FY10	FY03-FY08 Average
Franklin	95.7%	95.5%	94.9%
Jefferson	95.5%	95.4%	94.8%



BENEFIT #2

**ENERGY
SAVINGS**

**WE HAVE DECREASED OUR
OVERALL ENERGY
CONSUMPTION AT THE
GEOHERMAL SITES**



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HOW WE DECREASED IT

- **NO NATURAL GAS THERMS, BUT INCREASED KW OF ELECTRICITY**

- **EVIDENCE IS SHOWN IN THE ATTACHED CHART OF JEFFERSON'S TOTAL ENERGY USAGE EACH MONTH FROM 2003-2009**
 - **IT'S A CALCULATION OF KW-TO-BTU PER SQUARE FOOT**

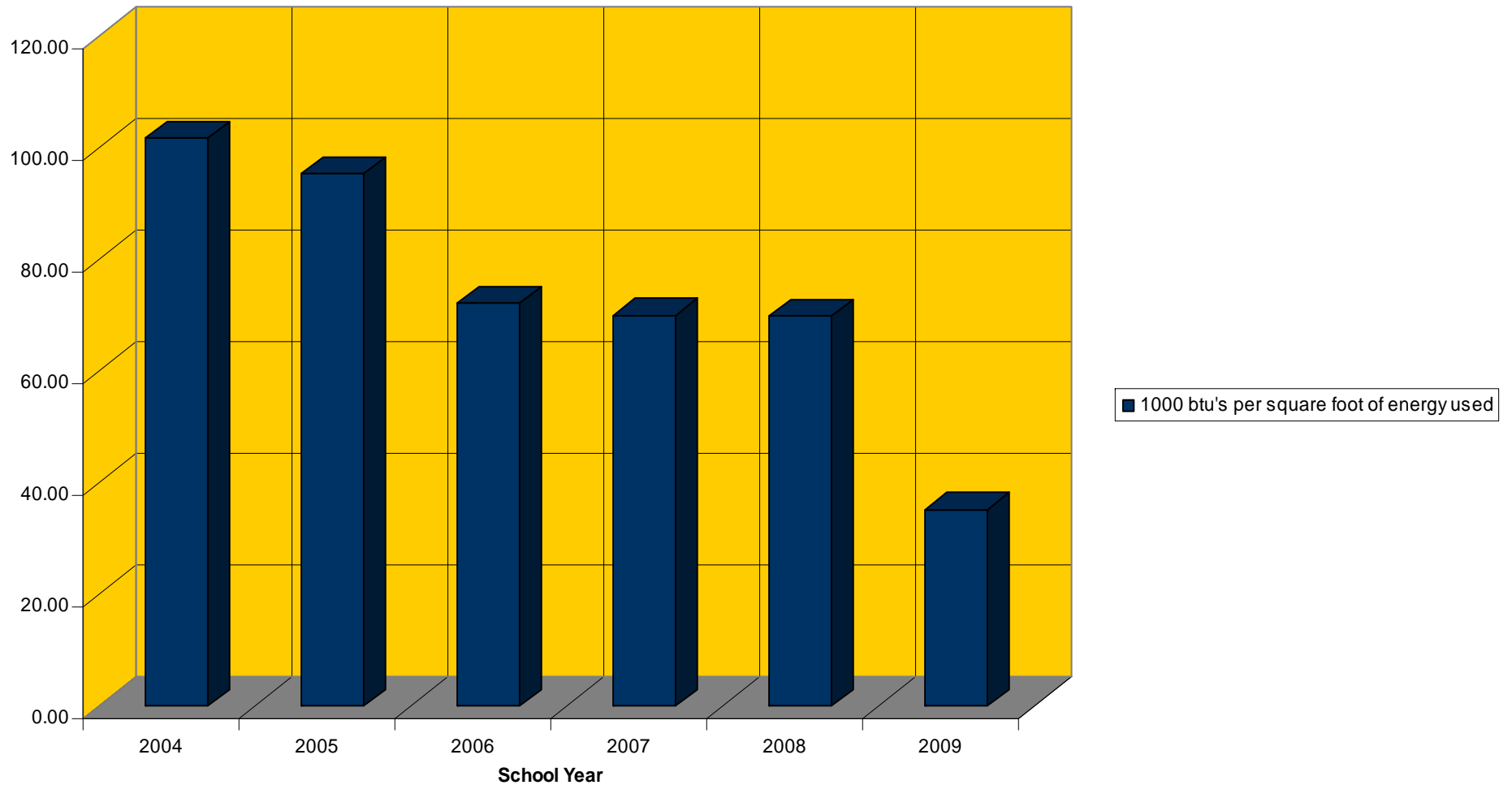
 - **ESTABLISHED BY DISTRICT ENGINEER KIRK MESCHER**



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JEFFERSON ENERGY USAGE FROM 2003 - 2009

Jefferson School Kbtu/square foot usage





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JEFFERSON ENERGY USAGE

□ SO, WHAT ARE THE RESULTS?

- THE 2004-2008 AVERAGE KW/BTU USAGE (PER SQ. FT.) WAS **81,800 UNITS**
- THE 2009 KW/BTU USAGE (PER SQ. FT.) WAS **35,200 UNITS**
- THAT'S A **56.95% REDUCTION** IN KW/BTU USAGE



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FRANKLIN ENERGY USAGE

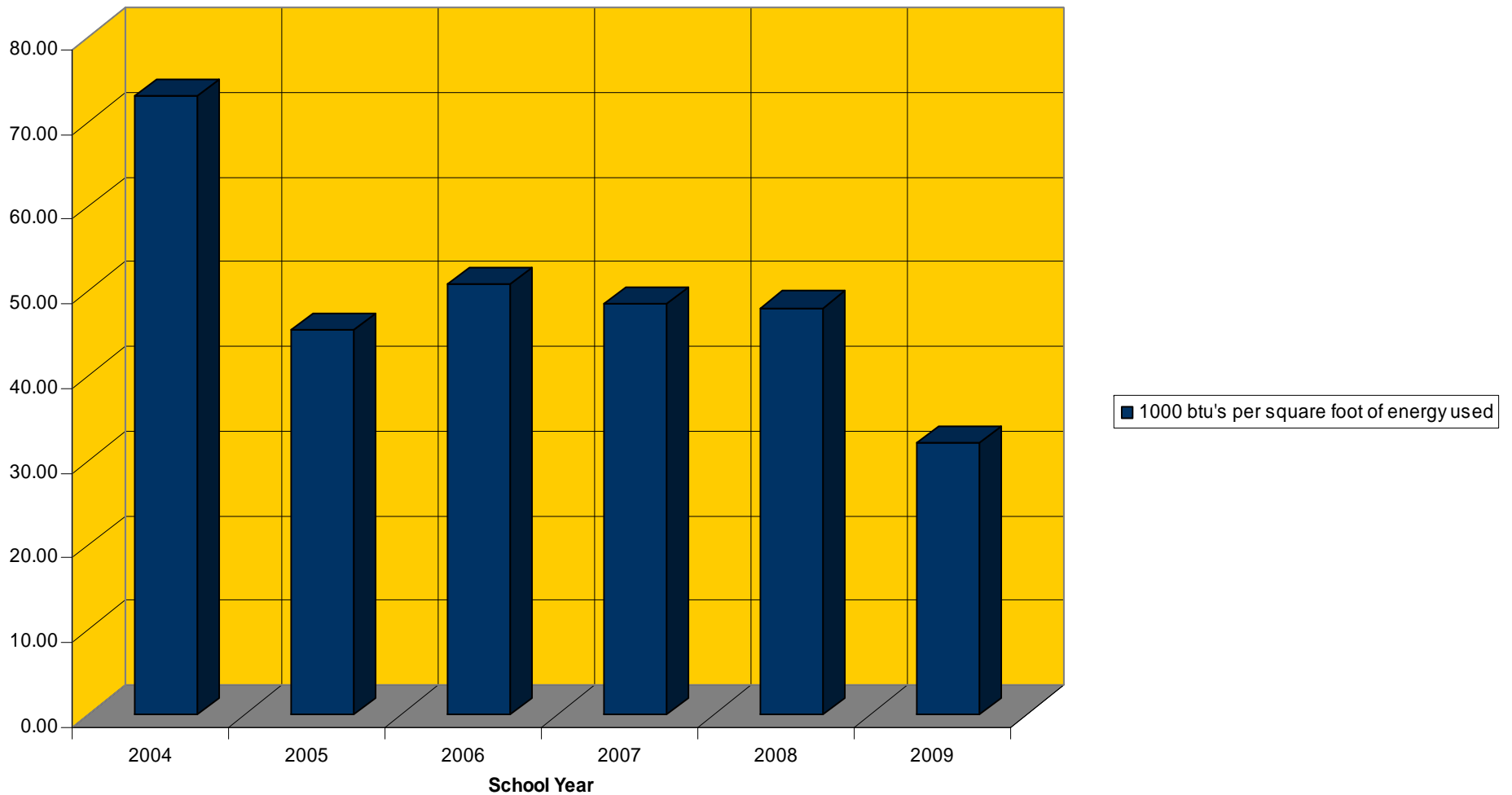
**DOES FRANKLIN
ELEMENTARY HAVE
THE SAME
RESULTS?**



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FRANKLIN ENERGY USAGE FROM 2003 - 2009

Franklin School Kbtu/square foot usage





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FRANKLIN ENERGY USAGE

□ SO, WHAT ARE THE RESULTS?

- THE 2004-2008 AVERAGE KW/BTU USAGE (PER SQ. FT.) WAS *53,150 UNITS*
- THE 2009 KW/BTU USAGE (PER SQ. FT.) WAS *32,130 UNITS*
- THAT'S A *39.53% REDUCTION* IN KW/BTU USAGE



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BENEFIT #3

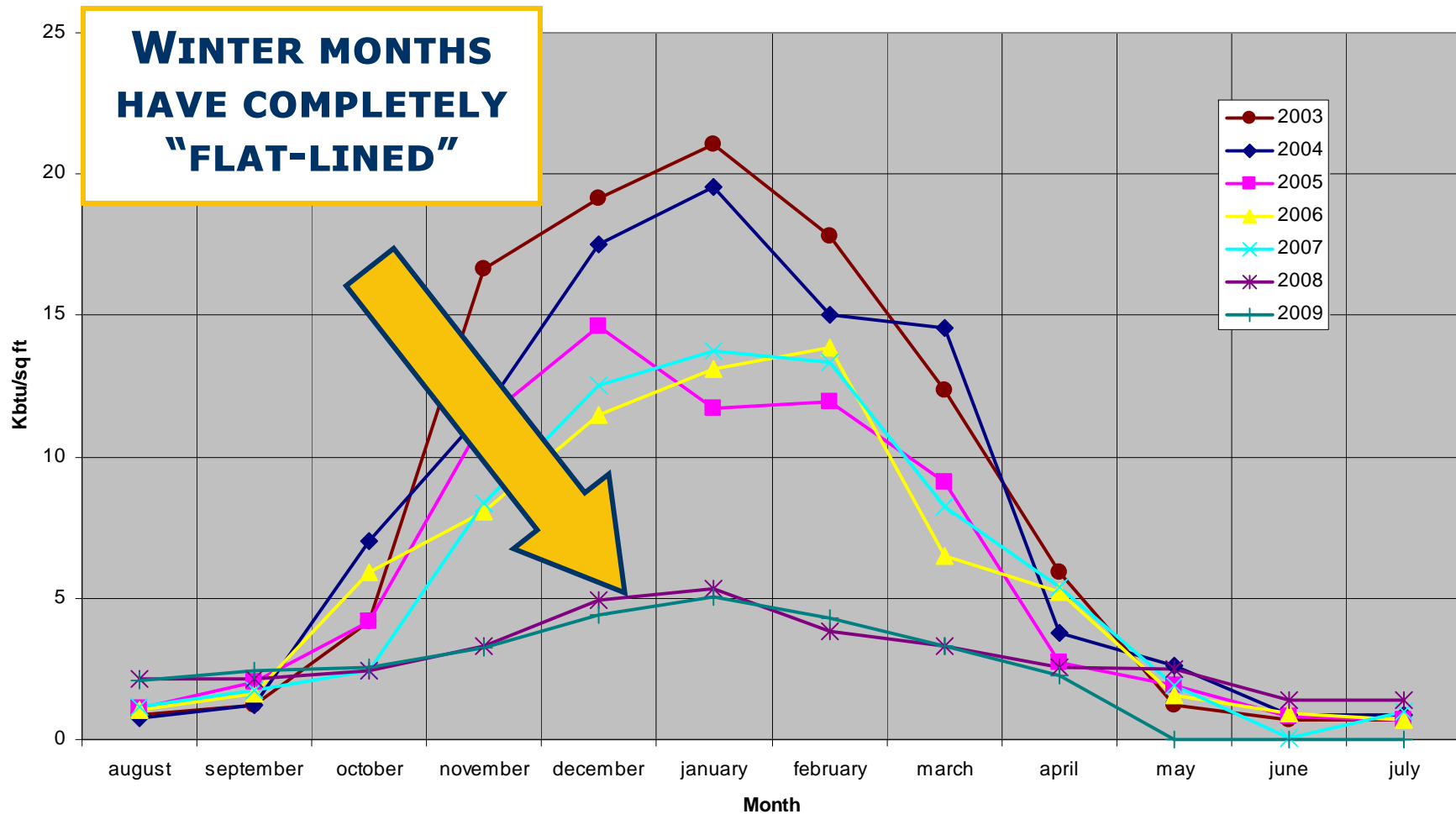
- CONSISTENT ENERGY BILLS**
- WHERE OUR ENERGY BILLS USE TO SPIKE IN THE WINTER MONTHS, THEY'RE NOW FLAT-LINED**
- EVIDENCE CAN BE FOUND IN THE FOLLOWING ENERGY-USAGE GRAPHS FOR FRANKLIN AND JEFFERSON ELEMENTARIES**



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JEFFERSON ENERGY USAGE

Jefferson School Energy usage

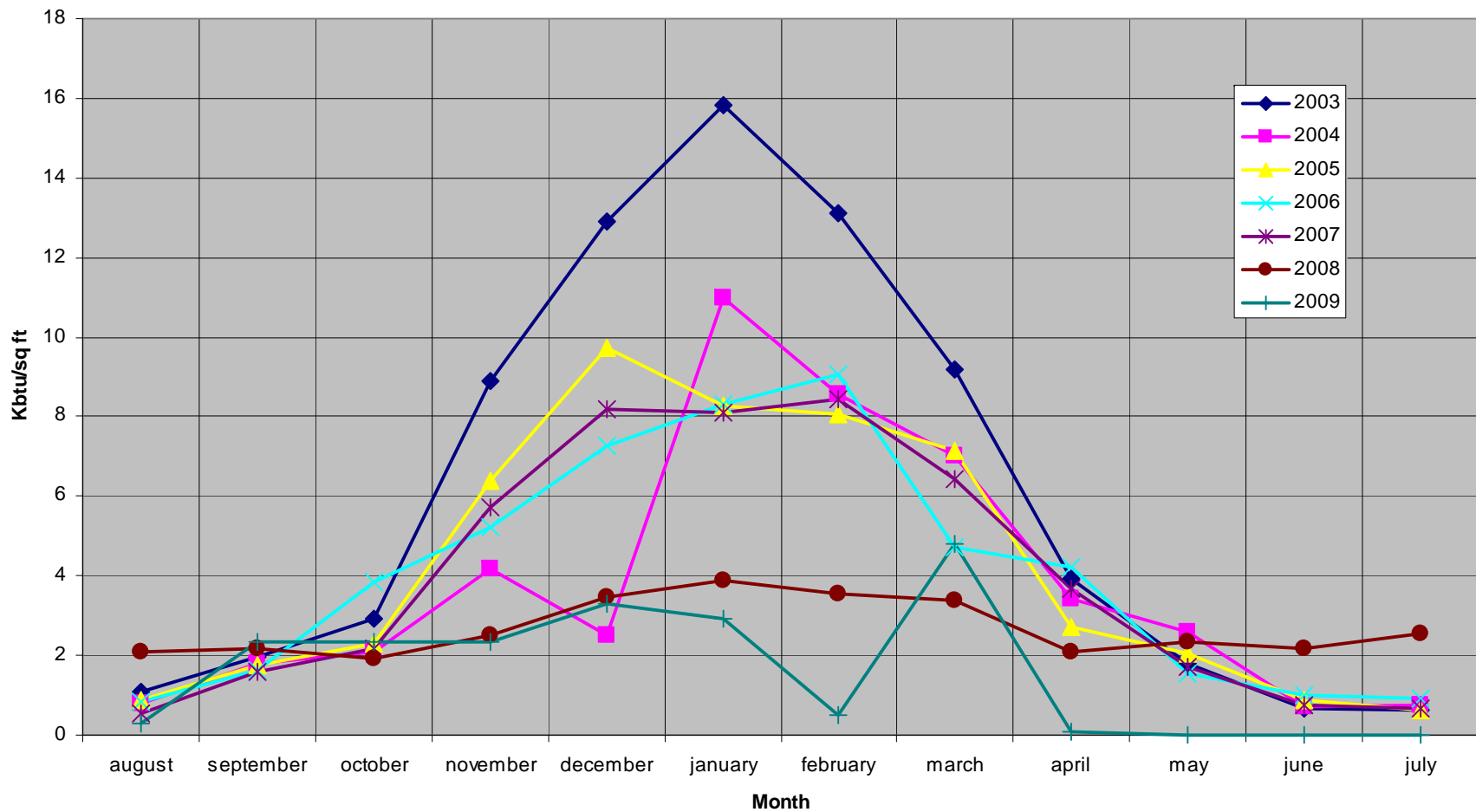




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FRANKLIN ENERGY USAGE

Franklin School Energy usage





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BENEFITS #4 AND #5

TWO OTHER SIGNIFICANT GEOTHERMAL BENEFITS HAVE BEEN:

- CLEAN ENERGY GRANT OPPORTUNITIES**
- POSITIVE RECOGNITION**



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GREAT FOR GRANTS!

ENVIRONMENTALLY "GREEN" ENERGY

- **SPS RECEIVED THE DEPT. OF COMMERCE AND ECONOMIC OPPORTUNITY'S THERMAL EFFICIENCY PROGRAM GRANT**
- **\$363,000 IN 2010 FOR WASHINGTON ELEMENTARY'S GEOTHERMAL PROJECT**



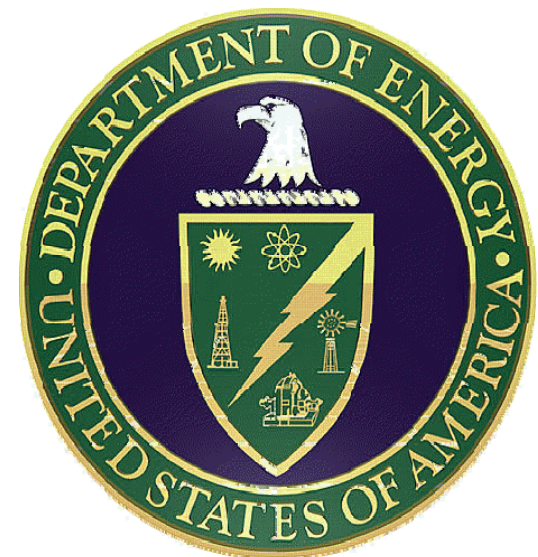
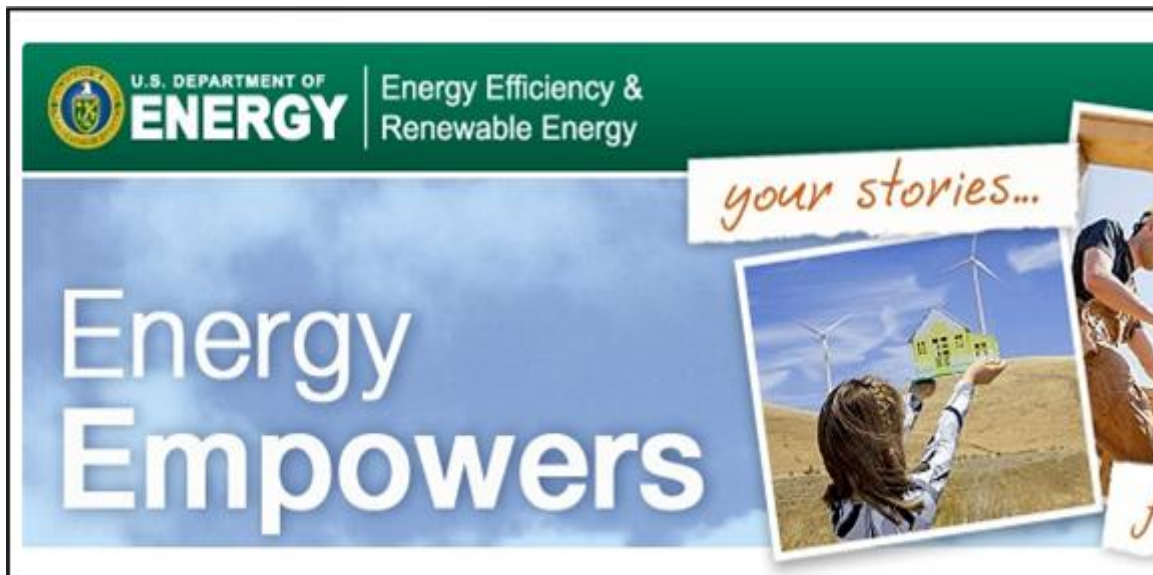


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GREAT FOR RECOGNITION!

ENVIRONMENTALLY "GREEN" ENERGY

SPS WAS HONORED IN THE DEPARTMENT OF ENERGY'S MAY E-MAGAZINE, ENERGY EMPOWERS, FOR OUR GEOTHERMAL INITIATIVE – [HTTP://WWW.ENERGYEMPOWERS.GOV](http://www.energyempowers.gov)





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PART #4

**WHAT ARE THE
TYPICAL
INSTALLATION
COSTS?**



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WHAT ARE THE INSTALLATION COSTS?

- INDUSTRY AVERAGE FOR A TRADITIONAL VENTILATION SYSTEM REPLACEMENT COST:**
 - \$14 – \$18 PER SQ. FT.**

- INDUSTRY AVERAGE FOR A SINGLE-LOOP GEOTHERMAL SYSTEM REPLACEMENT COST:**
 - \$16 - \$25 PER SQ. FT.**

- EVEN THOUGH THE INSTALLATION COSTS ARE HIGHER, DUE TO ENERGY SAVINGS, THE TYPICAL PAYBACK IS 7 – 10 YEARS**



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PART #5

**WHAT ARE
THE FUNDING
OPTIONS?**



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PART #5

WHAT ARE THE FUNDING OPTIONS?

□ BONDING

- HLS
- QZAB

□ GRANTS

■ (STATE)

- IL CLEAN ENERGY FOUNDATION GRANT
- NEW ISBE ENERGY EFFICIENCY GRANT

■ (FEDERAL)

- DEPT. OF ENERGY



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