

CCSD Energy
Conservation Program
BOE Update

2/26/2015

CCSD Energy Conservation

- Purpose:
 - To maintain comfortable learning environment while minimizing consumption of utilities.
 - Good for the environment.
 - Cost Avoidance / Minimize the rate of increase.
 - Energy: ~2% of budget.
- Three Components
 - Education
 - Energy Education
 - Awareness of energy consumption
 - Behaviors
 - Turn lights out when you leave the room
 - Shut off computer monitor at the end of the day.
 - Purchasing
 - EPEX – Consortium purchasing
 - Aggregate purchasers of gas and electric to leverage economy of scale.

CCSD Energy Conservation

- Three Components, continued...
 - Equipment
 - Technology: Amerseco / TBS
 - Use of building automation to control heating and cooling systems to maximizing conservation while maintaining comfort.
 - » Systems automatically lower thermostat settings after school.
 - Electronic ballast / fluorescent lighting, Occupancy / Photo sensors, Energy efficient motors
- Energy Program Management
 - Energy Specialist – Rob Humphries
 - Monitors building usage and comfort during occupied times.
 - Monitors operational efficiency of equipment.
 - Communicates repair issues to district staff.
 - Supports the district's energy policy and guidelines.
 - Audits buildings during occupied and unoccupied times.
 - Tracks & analyzes energy consumption for all buildings
 - Monitors utility bills for issues and errors.
 - Creates a climate of conservation.

CCSD Energy Conservation



Energy Program Success

Success Factors

1. **Teamwork** — All personnel
2. **Data analysis** — Energy Specialist
3. **On-site training and expertise** — Cenergistic
4. **Comprehensive facility audits** — Expert identification of energy conservation opportunities throughout system facilities

Program Benefits and Features

1. **Budget** — Cost Avoidance
2. **Environmental** — Conservation of natural resources
3. **Self-funding program** — Conservation activities cover costs for the program
4. **Longevity** — Program designed to be ongoing, with free support from Cenergistic after paid contract term

Teamwork

The success of the program depends on everyone!

Special thanks go to:

- **Board of Education** for supporting a methodical approach to energy conservation
- **Administration** for supporting the program
- **Principals** and **Staff** for coordinating efforts in their schools
- **Teachers & students** for reducing energy waste in classrooms
- **Maintenance** for troubleshooting, repairing, and PM
- **Custodians & Supervisors** for operation of manual controls & reporting issues

A Day in the Life of an Energy Specialist

- Perform building audits at occupied and unoccupied times
 - Temperatures, lights, fans, water leaks, electronics, boilers, pumps
- “Comfort” calls
- People problem vs. Computer problem vs. Mechanical problem
- Program BAS/EMS settings and schedules for occupied times
- Audit electric, natural gas, oil, & water utility bills
- Planning for seasonal changes & extended breaks
- Promoting an “energy conservation culture”
- Training with Cenergistic Engineers and Consultants
- Continually assess and re-assess the program (marathon)



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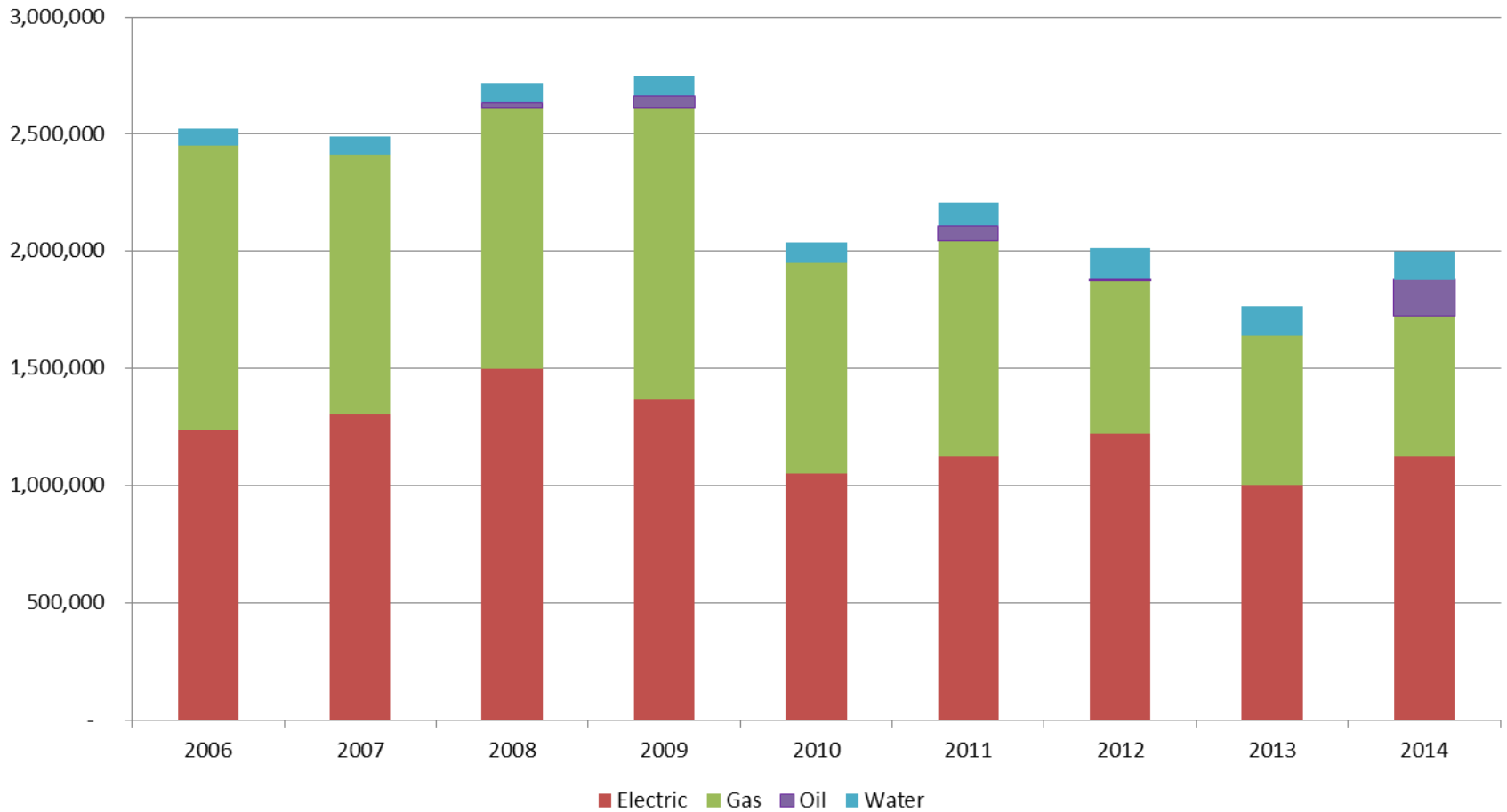
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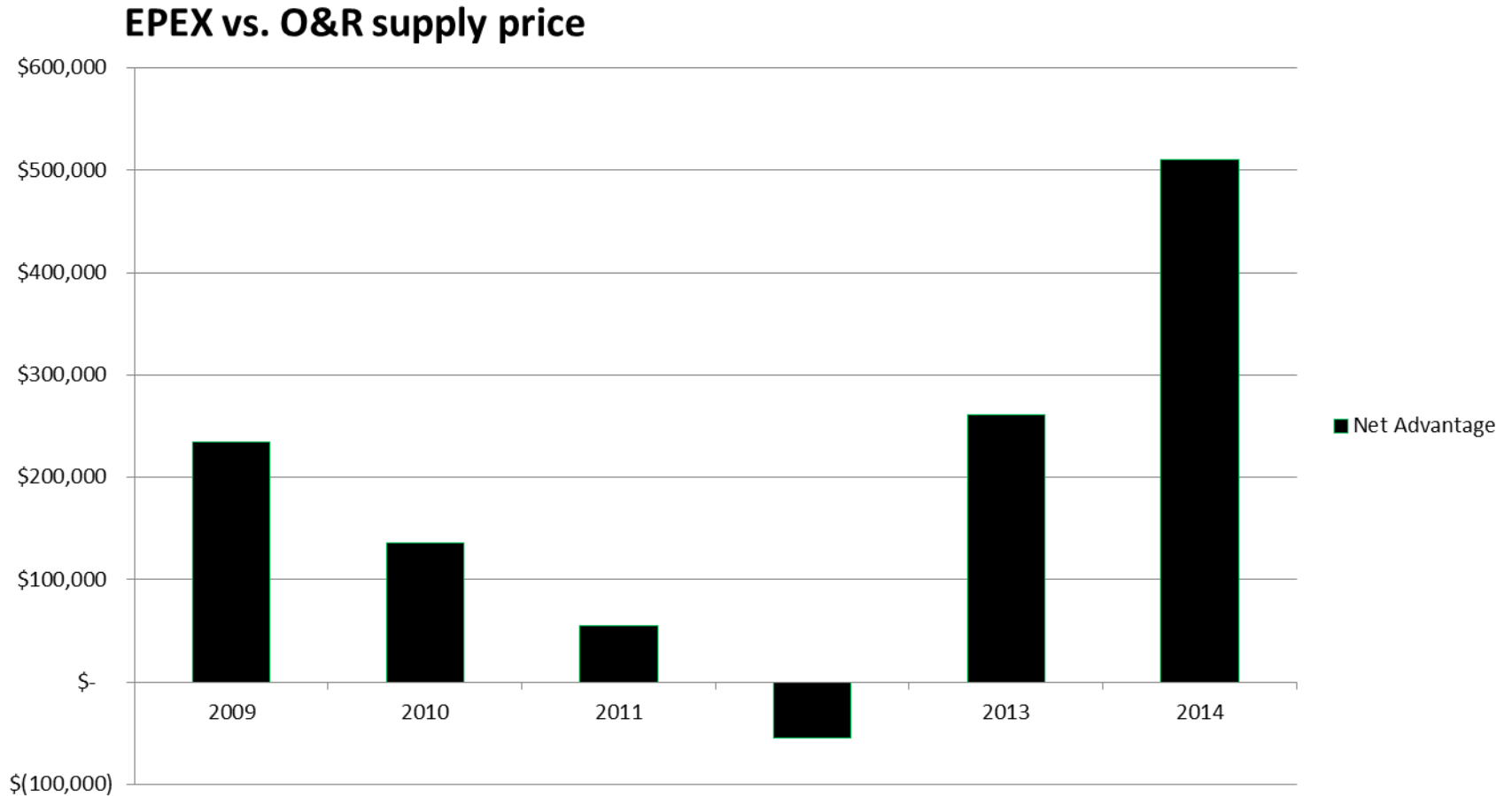
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CCSD Utility Expenses (WinCap)



Utility Supply Purchasing Consortium



MEASUREMENT and VERIFICATION

EnergyCAP & IPMVP

– software using industry standard written by the
U.S. Department of Energy

International Performance Measurement & Verification Protocol

(U.S. DOE Document #DOE/GO-102002-1554)

- **Cost Avoidance**

(Expected energy usage - actual energy usage) x today's unit cost

MEASUREMENT and VERIFICATION

- **In order to account for changes in energy usage from year-to-year, the standard prescribes that adjustments be made for ...**
 - Changes in weather
 - Changes in building sq. ft. including the addition/removal of portables
 - Adding/removing mechanical systems & other energy-consuming technology (FFMS cafeteria A/C, NHS Annex boilers, ...)
 - Differences in monthly billing cycles between the base period & current reporting period

Since March 2009, CCSD has **reduced** our *expected* energy use by **16%** (EnergyCAP)

Expected energy use: 717,763 mmbtu

Actual energy use: - 603,617 mmbtu

Avoided use: = 114,146 mmbtu

Electric = 20%

Gas = 14%

Water = 10%



Energy Program Environmental Impact



Equivalent to one of the following:

Greenhouse gas reduction (metric tons) CO₂ 6,955

Tree seedlings planted & grown for 10 yrs 178,346

Passenger cars not driven one year 1,449

Since March 2009, CCSD has
avoided spending
over **18%** on utilities (EnergyCAP)

Expected energy cost:	\$14,216,570
<u>Actual energy cost:</u>	<u>-11,613,884</u>
Avoided energy cost:	\$2,602,687
<u>Utility refunds:</u>	<u>+ 99,914</u>
Program benefit:	\$2,702,601

Electric = \$1,540,532
Gas/oil = \$1,141,743
Water = \$ 20,326



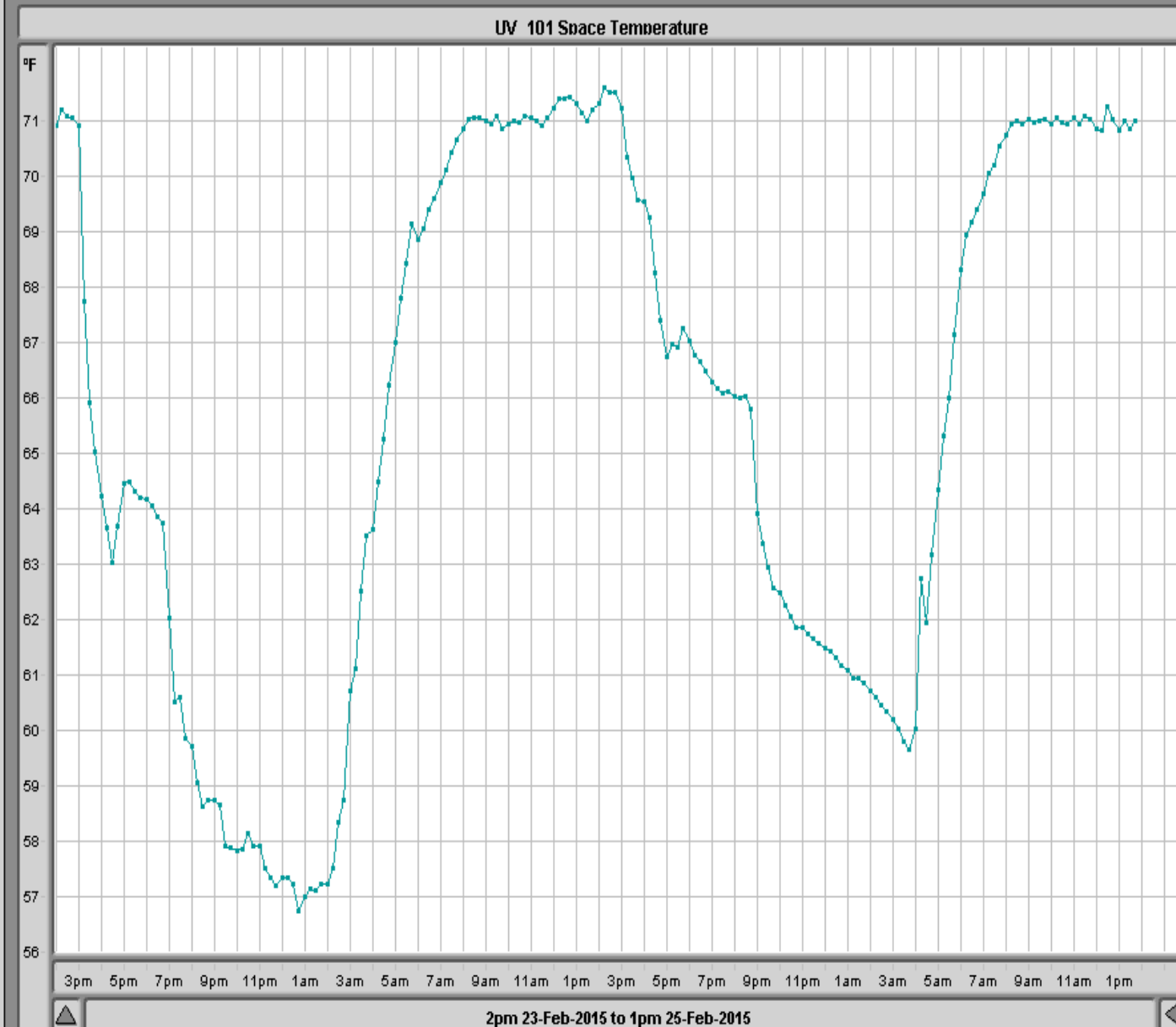
How?



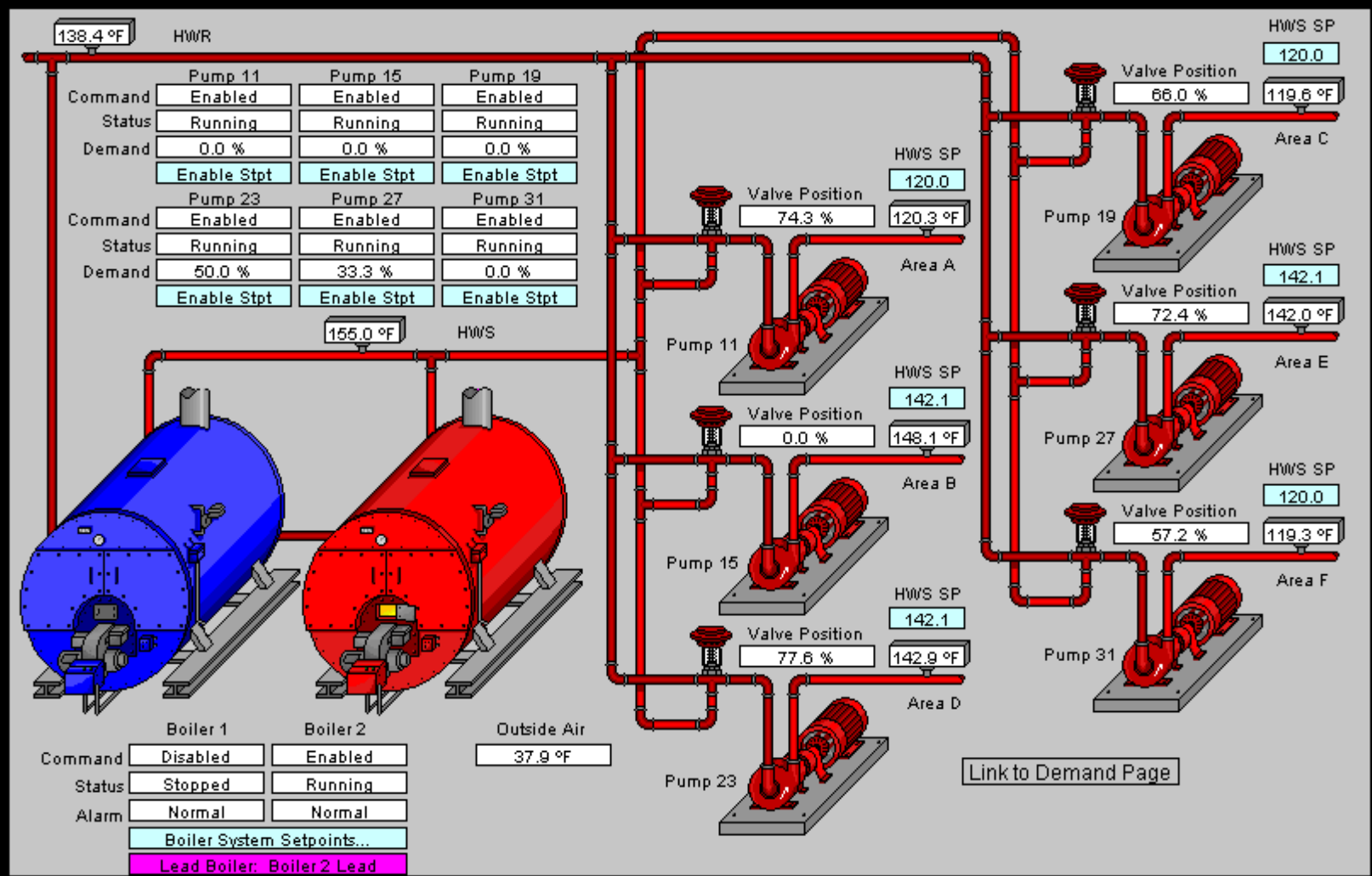
Control



- [Main Map](#)
- [Spaces...](#)
- [Mech Systems...](#)
 - [Addition HW Pumps](#)
 - [AHU-1 Multi-Purpose](#)
 - [AHU-1 Gym](#)
 - [AHU-2 Gym](#)
 - [AHU-3 Gym](#)
 - [AHU-4 Gym](#)
 - [AHU-5 Reading Room](#)
- [Room](#)
 - [Diff Press Valves](#)
 - [Exhaust Fans](#)
 - [Heating System](#)
 - [RTU-1 Main Office](#)
- [EF Summary](#)
- [UV Summary](#)
- [Global Settings](#)
- [Schedules...](#)
- [Logs & Charts...](#)
- [Advanced...](#)



UV_101 Space Temperature



Boiler Plant



Awareness



Happy Holidays!

As you prepare for the holiday break, please do your part to

consider energy conservation opportunities.



Remember to:

- Set-back adjustable **thermostats**
- Consolidate, clean, and defrost **refrigerators**
- Turn off or unplug non-essential **energy-using items** (does it have a light or clock?)
- Report temperature and ventilation problems immediately

It's time to give thanks



Thank you for remembering to shut off all unnecessary lights and electronics every day.

Please remember to defrost your refrigerator over the break.

Happy Thanksgiving!

Energy Conservation Inquiries and Troubleshooting:

Rob Humphries

845-639-5618 energymanager@ccsd.edu



Oops!

If you found your electronics on, even “sleeping”, after returning from the snow days & break, energy was wasted and unnecessary costs were incurred.

Please remember to:

- Set-back adjustable **thermostats** nightly
- Turn off or unplug non-essential **energy-using items** nightly
(does it have a light or clock?)
- Report temperature and ventilation problems immediately

*Thanks for everything you do to help
save!*



CLARKSTOWN

Central School District

Saving Energy
Saving Dollars

When I was young,
I was afraid of the dark.



Now, when I see the
electric bill,



I'm afraid of the lights!



Happy Halloween!

Rob Humphries

energymanager@ccsd.edu

Please remember to conserve by:

- adjusting thermostats
- turning off or unplugging all unnecessary electronics
- reporting all heating issues immediately



Shutting off your electronic equipment should be a “no brainer”



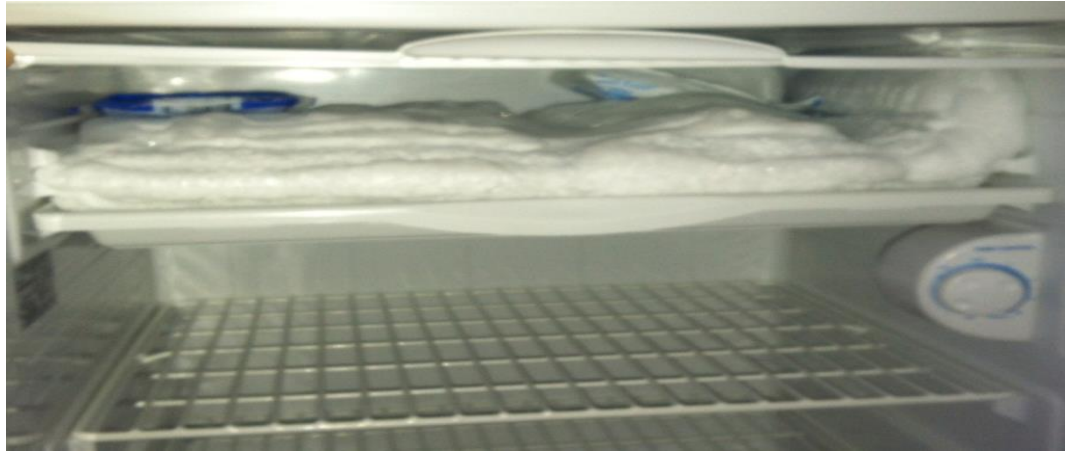
Overall, we are achieving a 78% electronic shutdown efficiency
Congratulations to Laurel Plains ES -
Leading the way with an 87% shutdown efficiency!

Please remember to conserve by:

- adjusting thermostats
- turning off or unplugging all unnecessary electronics
 - reporting all heating issues immediately
- consolidating & unplugging refrigerators over the break



Does your freezer look anything like this?



If so, spring break is the perfect time to defrost!

**Even if it doesn't look this bad,
shut it down over the break anyway.**

(Ask your custodian for assistance)

Please remember to conserve energy daily by:

- **adjusting thermostats**
- **turning off or unplugging all unnecessary electronics**
- **reporting all heating issues immediately**

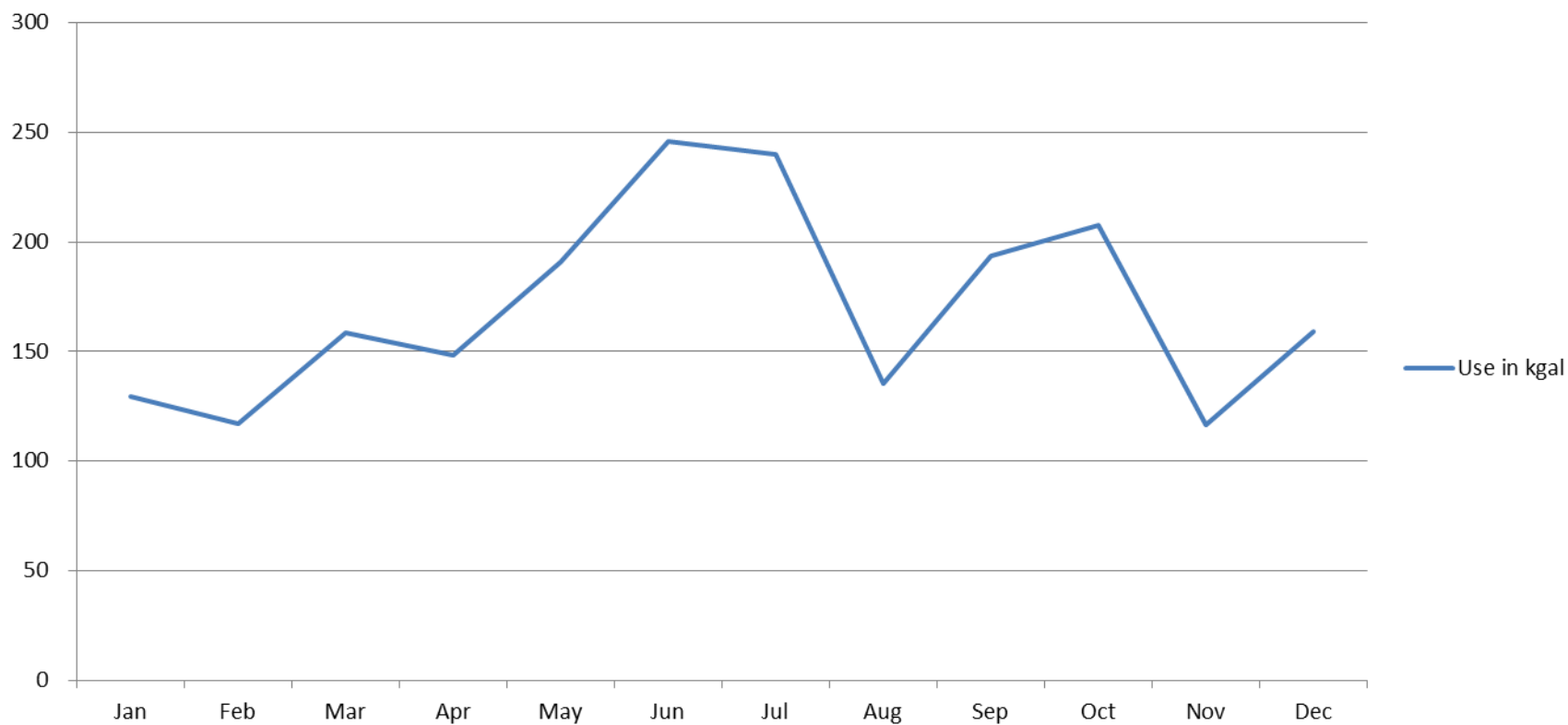
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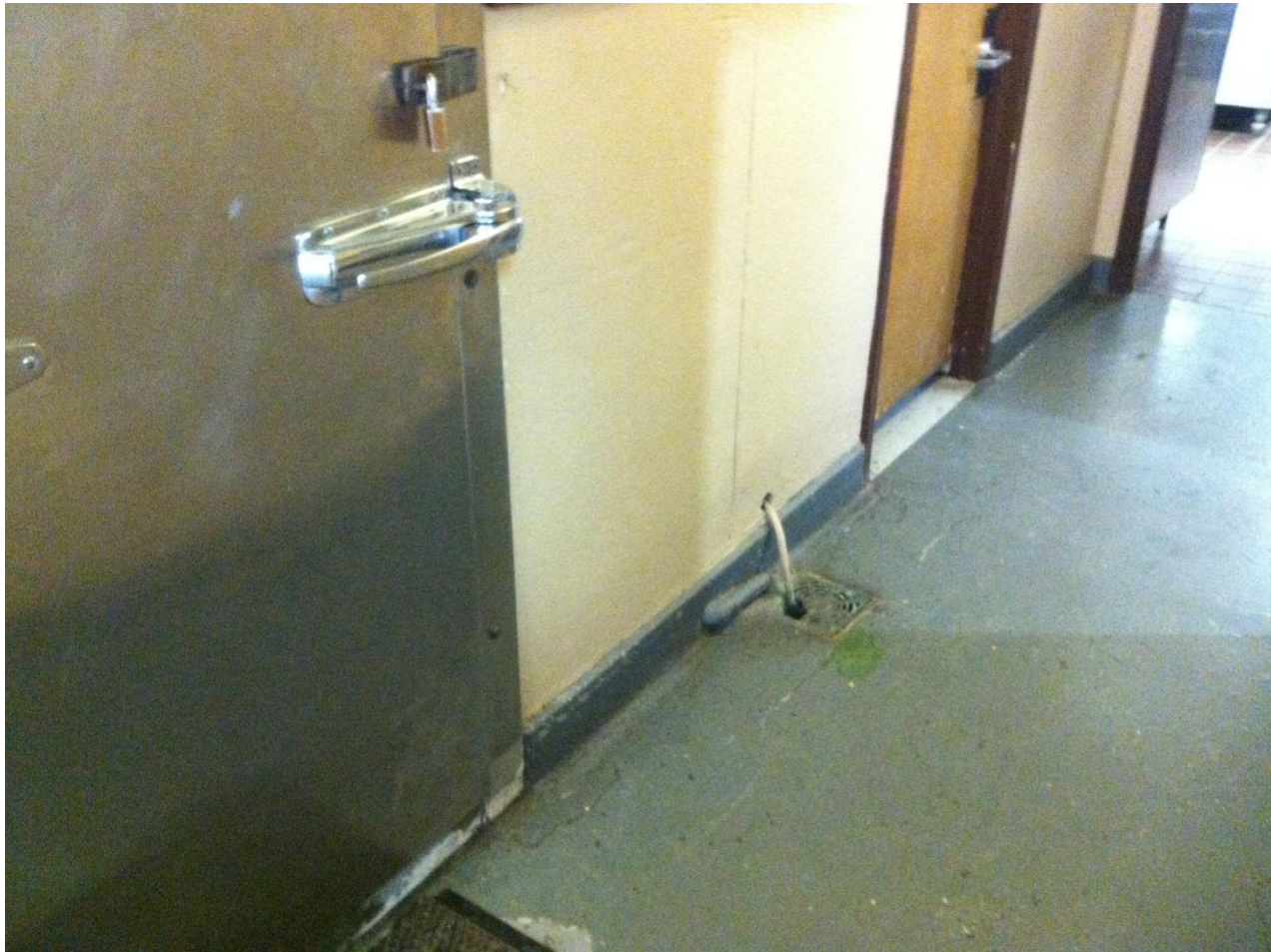
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Utility bill auditing

NHS main water



NHS walk-in refrigerator



NHS walk-in refrigerator



NHS walk-in refrigerator

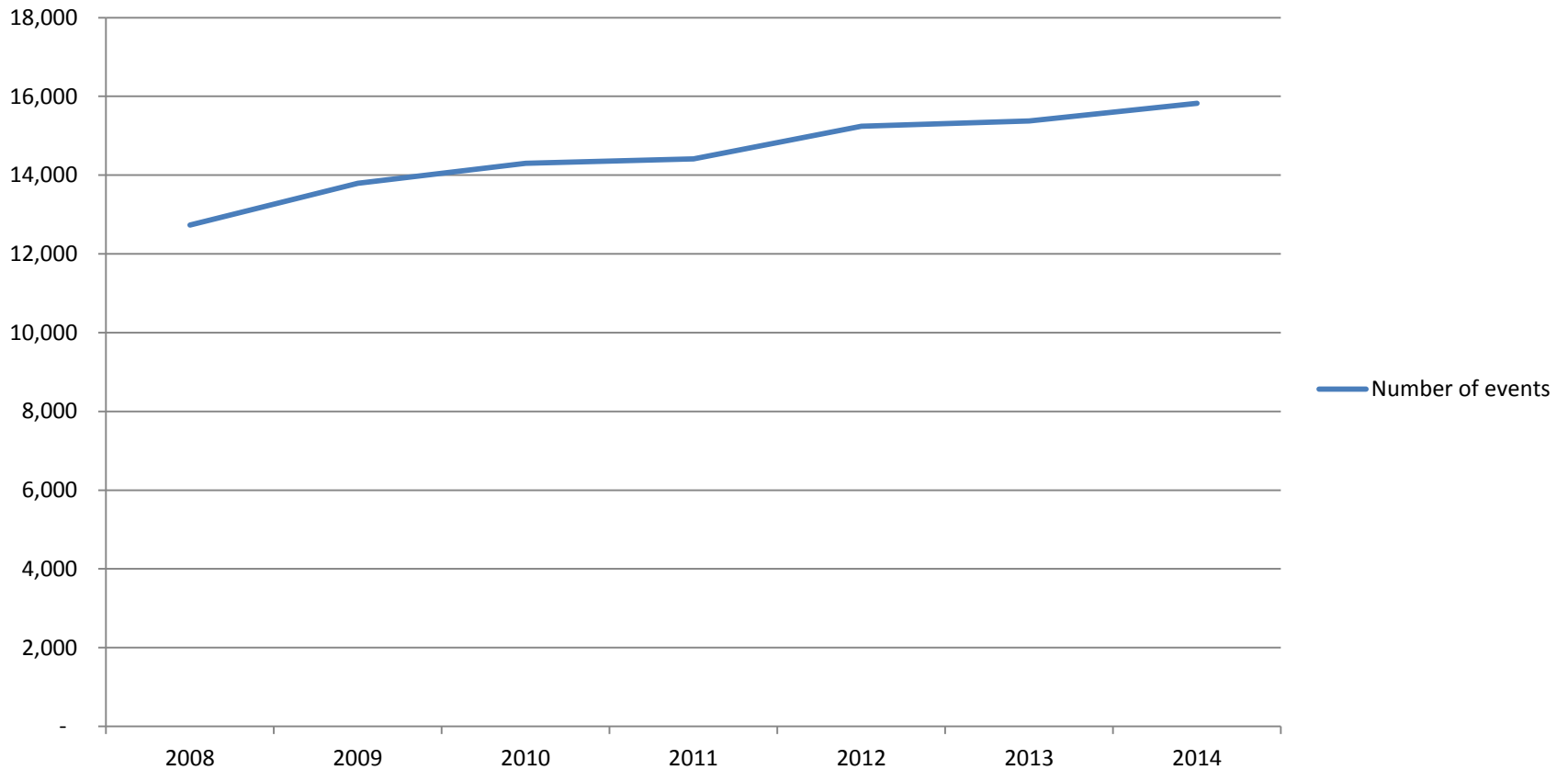


Challenges

- **Keeping 2 people happy in the same (office) space**
- **Multiple systems with multiple thermostats in same space, split rooms, etc.**
- **Increased after-hours facility use**
- **Aging equipment & technology:**
 - DDC, analog, pneumatic, local
- **A/C in classrooms (IEP)**
- **Plug-Load “creep”: electronics, appliances**
- **Increased charges: new capacity zone (Demand)**

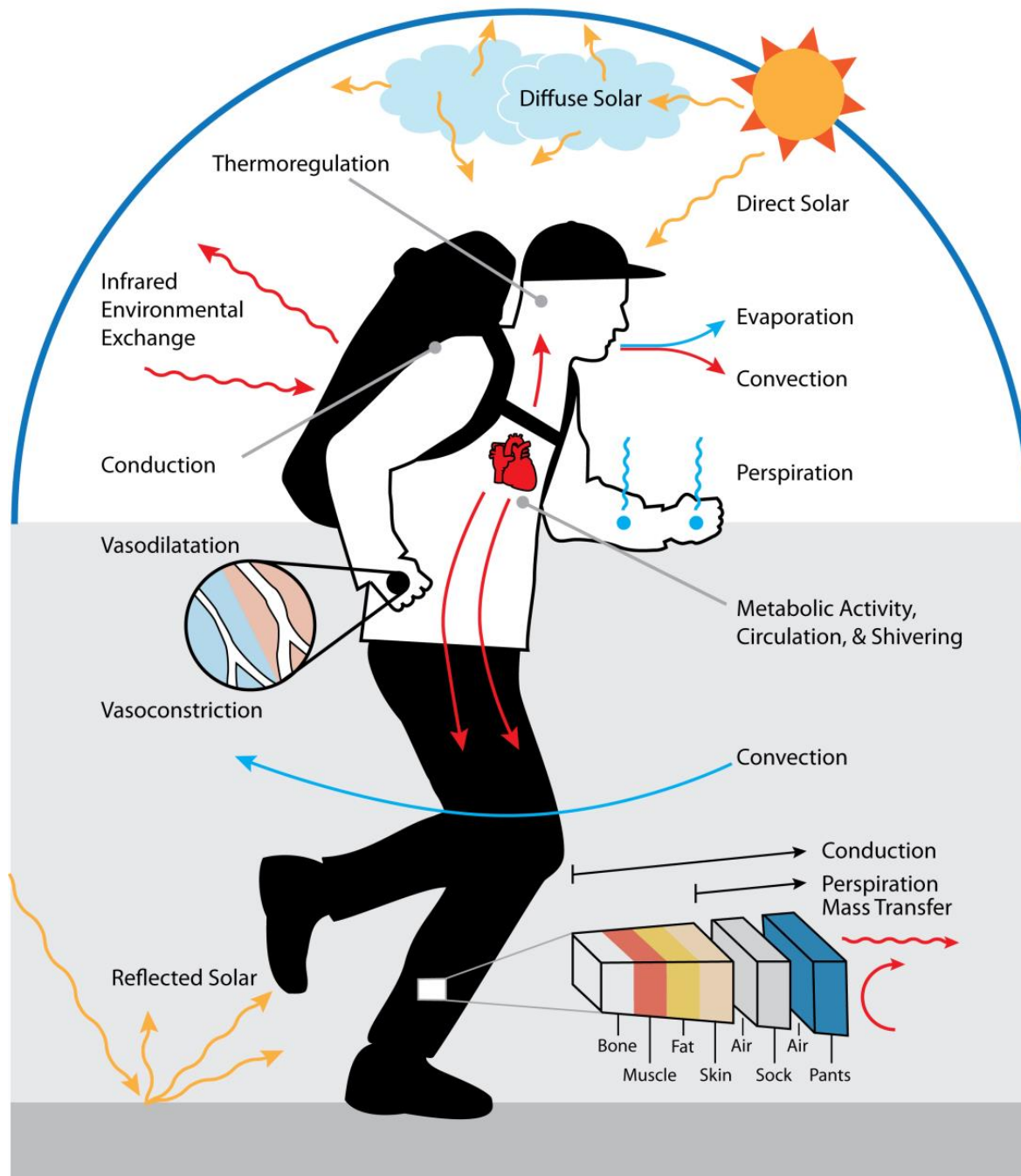
Facility usage is increasing

SchoolDude Facility Use Permits



What
do
you
see?



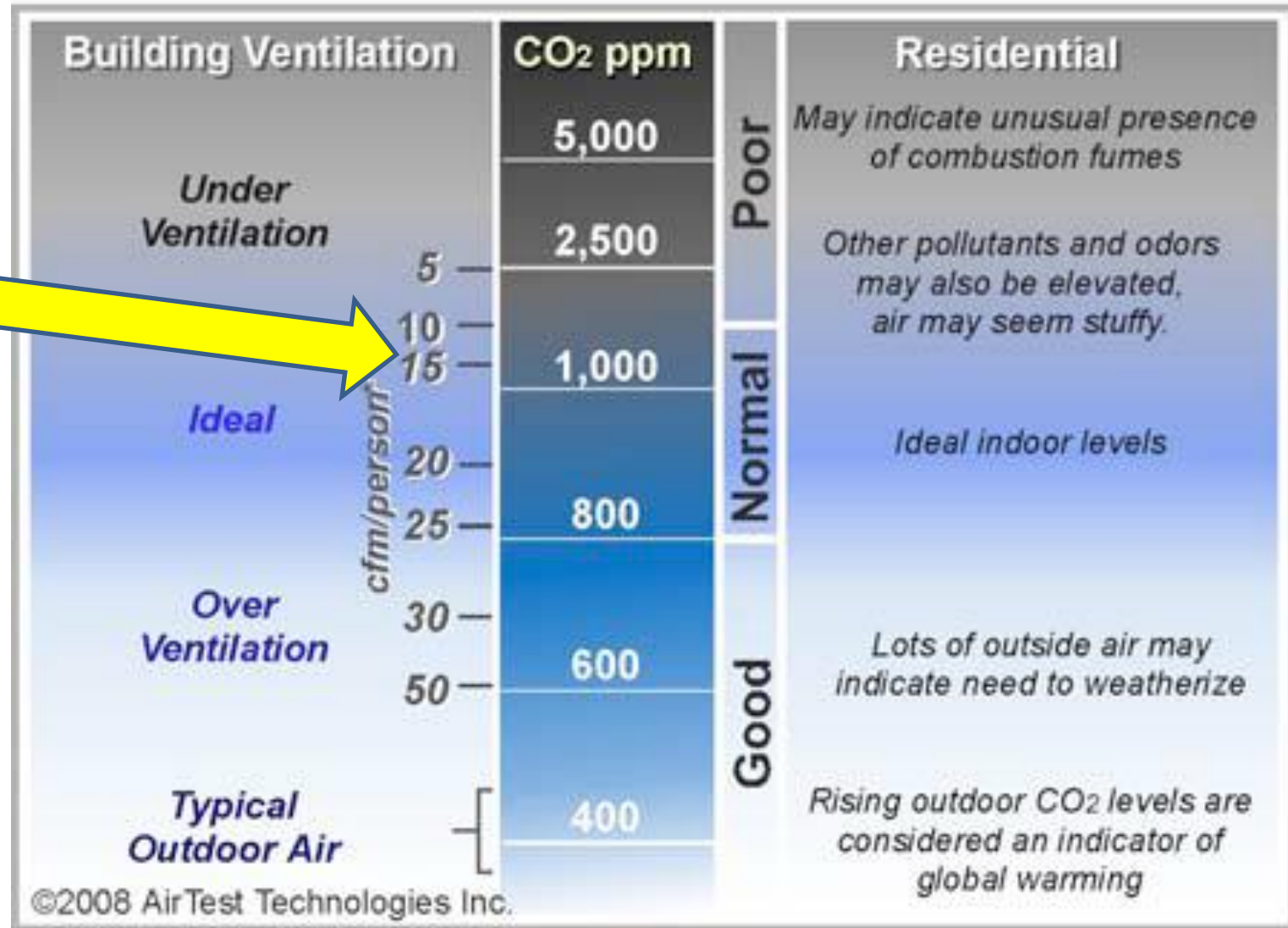


searchQuotes.com

**I'VE HAD A HORRIBLY BUSY DAY
CONVERTING OXYGEN INTO
CARBON DIOXIDE.**



Understanding Indoor CO₂ Levels



Note: Interpretation should be based on peak CO₂ readings in a space.

$O_2 \rightarrow \text{Carbon Dioxide} \rightarrow O_2$

- Requires 15 cubic feet of fresh air
per person - per MINUTE!



Classroom unit ventilator



What's the problem?

- Room too cold?

- Thermostat(s) need calibration
- Hot water valve stuck CLOSED
- outside air damper stuck OPEN
- Fan



- Room too hot/stuffy?

- Hot water valve stuck OPEN
- outside air damper stuck CLOSED
- intake grill blocked



- UV *really* noisy?

- Lube & adjust



Large Electric Billing



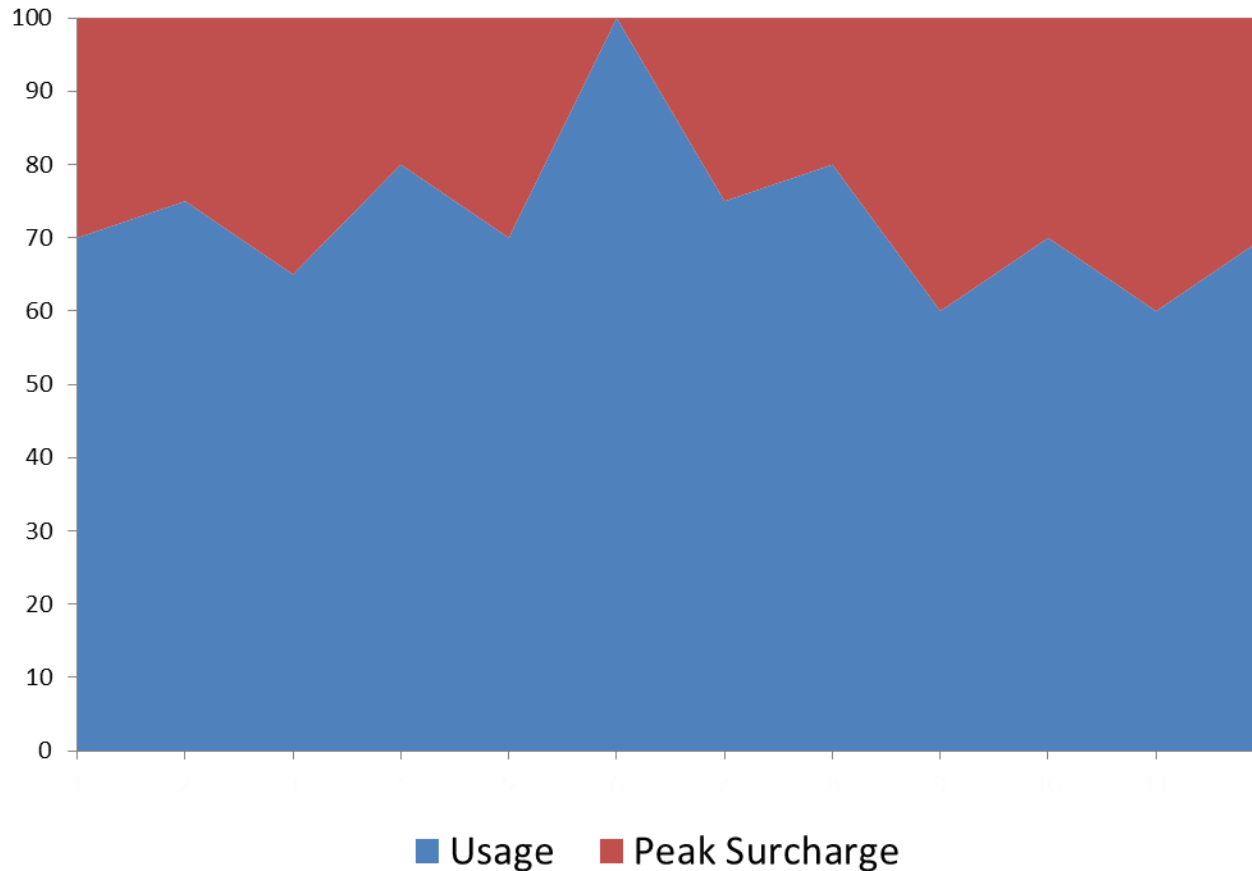
1) Kilo-watt hours \sim miles driven



2) Demand (kw) \sim Max. speed



Peak Demand charges ...



~ 25% of our electric cost

... like getting a speeding ticket
EVERY MONTH



Opportunities

- Continue energy awareness:
 - Email reminders, building audits, “*dis-comfort* calls”
- Continue auditing utility bills and investigating anomalies
- NHS & Congers construction adjustments via Cenergistic & EnergyCAP
- O&R “Green Team” & NYSERDA Flex-Tech audits:
 - control systems, walk-in refrigerators, lighting, NHS DHW tanks
- “Demand” ventilation/air quality efficiency: gym, auditorium, cafeteria, ...
- Wi-fi enabled controls: BERT
- NYS: Executive Order 88 (municipal, SUNY), PowerNY, Energy Highway
 - “Sandy” effect: Solar, wind, CHP, micro-grids



CLARKSTOWN

Central School District

Saving Energy
Saving Dollars

Believe it or not, spring is here.
Summer weather will not be far behind.



Please remember to:

- Set-back adjustable **thermostats** nightly
- Turn off or unplug non-essential **electronics** nightly
- Keep **windows** closed while the heat is on
- Report temperature and ventilation problems immediately

*Thanks for everything you do
to help conserve!*

