



Gumbo 24-7 Power Users

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What to learn ?

- Identify challenges and strategies to address specialized, energy-intensive building applications.
- How retrofits, operations and maintenance versus capital projects can deliver energy improvements





The Lab is a big town

- Oak Ridge National Laboratory
 - \$10 M – Natural Gas
 - \$10 M – Electricity
 - Prices are not going down
 - Need to be aware of future increases



- Two largest buildings on campus are biggest users...of energy
 - 4500 N/S
 - Large footprint
 - Significant number of labs and hoods
 - Once-through air/no recirculation
 - High number of air exchanges per hour!

Why 4500 South?

- Highest number of working labs
- Consumes 11% of campus energy
- Significant energy consumption is air handling
- Small reduction (e.g., 10%) in fan speed == significant energy savings (almost 40%)
- Significant safety improvements will result



4500 South Ventilation

- Variable Frequency Drives on Hoods
- Significant Savings
 1. Electricity
 2. Chilled Water & Steam Metering
- Rebalance HVAC
- Improved performance





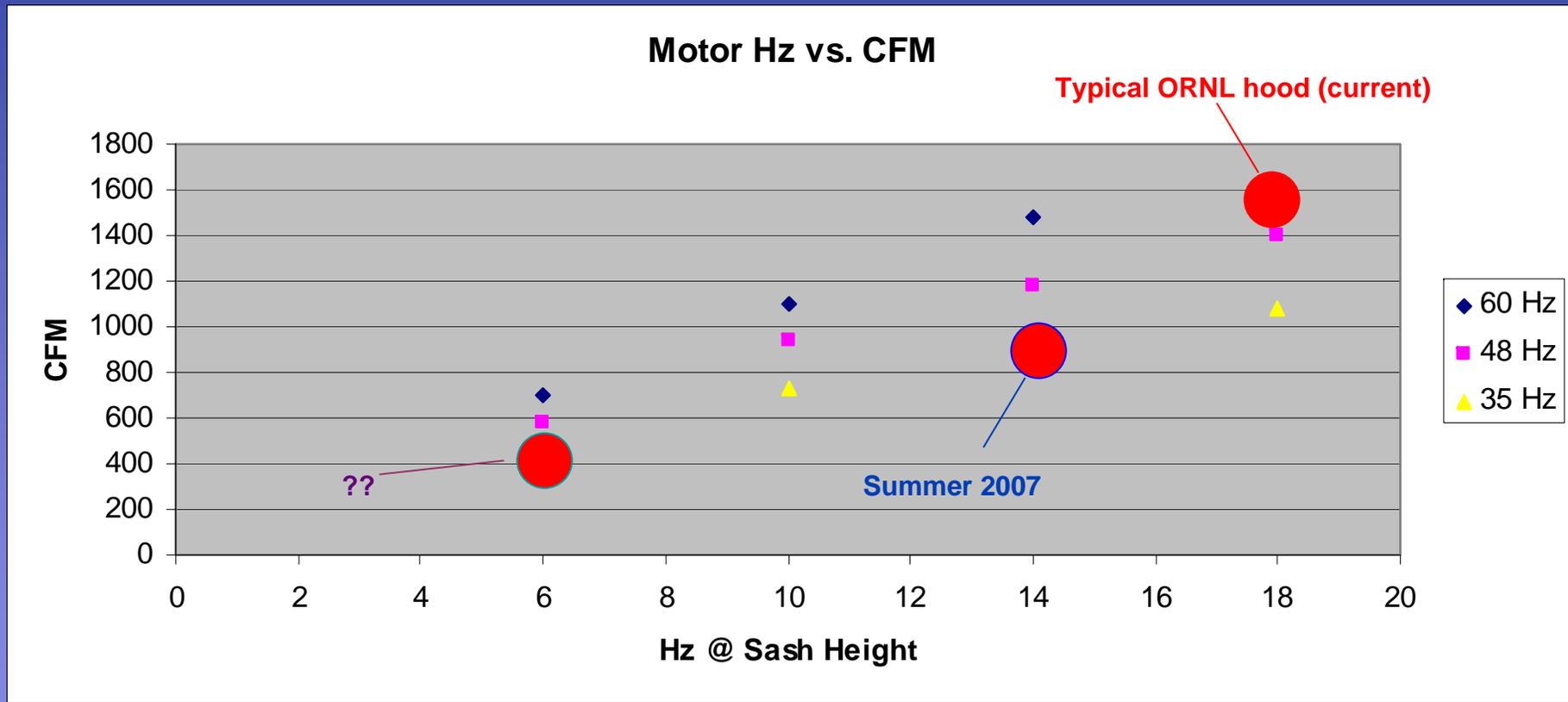
4500 South Utility Costs

- Electrical Cost \$642,906
- Steam Cost (Natural Gas) \$1,058,567
– 25 % Reduction
- Chiller Cost (Portion of electricity-4509) \$335,509

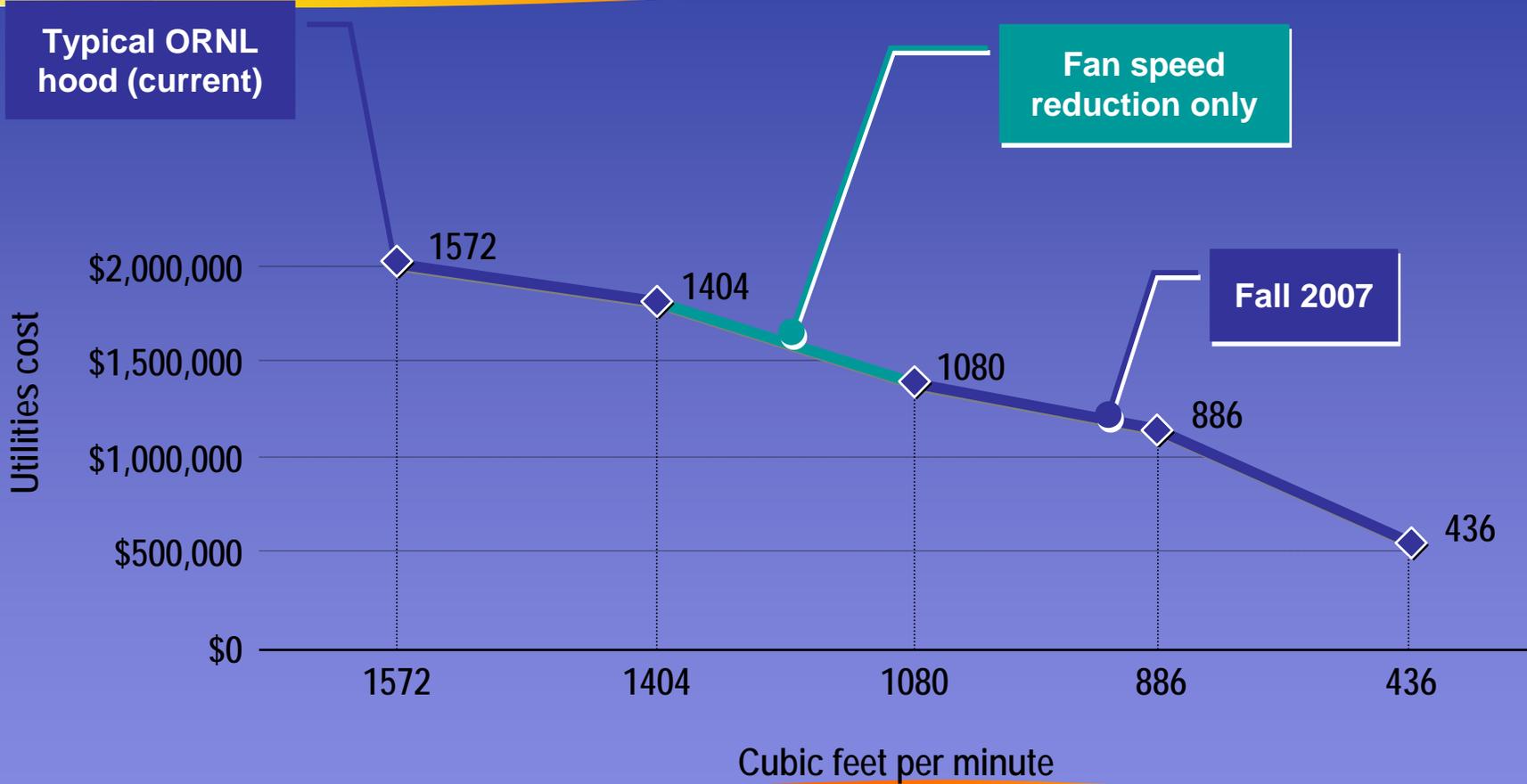
- Total \$2,036,982



Exhaust Hood Test



Airflow reductions equal big energy savings in 4500S





Any project must have M&V

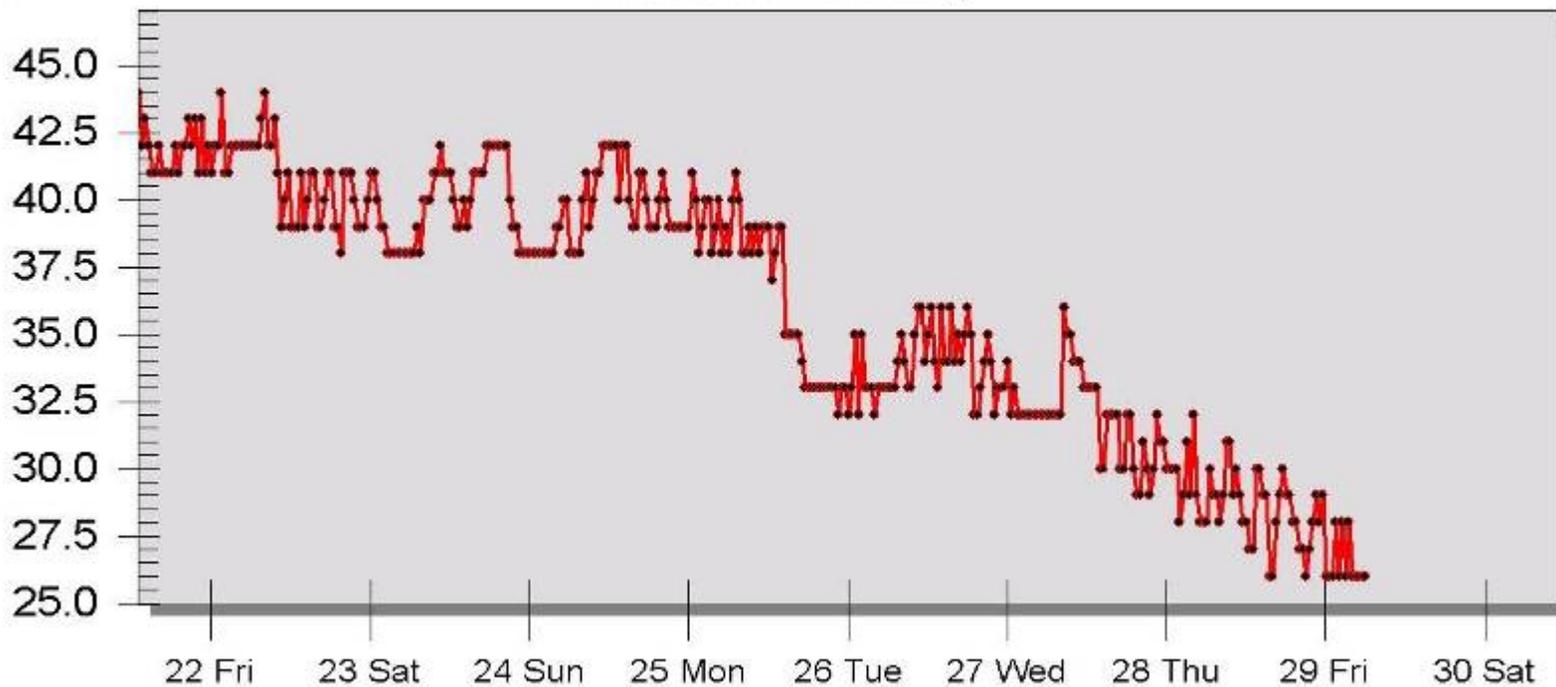
Historical Data Trend Report

System: ORNLPower
Report Start Time: 6/1/2007 12:00:00 AM
Report End Time: 6/29/2007 7:50:04 AM
Report Generated on: 6/29/2007 7:51:27 AM

Database Server: ENERGYISM63000
History DSN: Information Manager History SQL
System DSN: Information Manager System SQL

6/21/2007 15:16:44-88

West HH - W4 - Demand Current Avg



Jun 2007

Date/Time



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Other Items

- Lighting strike—*“Nothing Happened!”*
- Make heroes of the craft’s people
 - Electricians “Leaned” the Process
 - Nobody Programs “My Drives”





Where's the Money??!!??

Old view - traditional capital project

How do you view it as one-for-one replacement?





Challenges

- The right energy, at the right time, in the right amount
- Don't waste energy, use all you *need*.
- Hoods are funny things
- Old system / new system
- Is the new system capable?





All projects must stand alone

- Justify each project
- Must be independent in their costs
- Do not group them
- It's extra work but can be easier and more flexible





Be creative

- Look for ways to make projects dual purpose
- One-for-one replacement
- Justify one energy, safety, etc. to ensure greater chance of success





M&V for EVERY Project

Deming - you cannot improve what you do not measure

EVERY project must have a measurement component

This means steam, water, air, chilled water as well as electricity.