What Is Consuming The Energy Within Our Laboratories?
The energy is used by:

- Elevators
- Fan energy
- Heating
- Lighting
- Mechanical cooling
- Process load
- Reheat
Strategies To Optimize Energy Use
Elevators

- Hide the elevator
- Provide user friendly appealing stairs
Fan Energy

- Premium efficient motor
- Direct drive fan
- Variable airflow (VAV)
- Variable lab exhaust fans
- Reduce pressure drops
Reduce Pressure Drop by:

- Low face velocity across coils & filters
- Sound attenuators
- Low loss duct fittings
Square vs. Radius Elbow
24” by 12” duct elbow

Graph showing the comparison of airflow rates for different vane types and airflow velocities.
12” x 48” elbow

![Bar chart showing performance data for different velocities and vane types.](chart.png)
40” x 18” elbow

- DT vanes
- ST vanes
- Radius elbow

Velocity (fpm):
- 1000 fpm
- 1500 fpm
- 2000 fpm
- 2500 fpm
72” x 24” elbow
(radius w/ 12” throat)

DT vanes
ST vanes
Radius elbow

1000 fpm 1500 fpm 2000 fpm 2500 fpm
Radius Elbows Only
Heating

- Variable flow pumps
- Minimum 40°F temperature drop
- Reset heating water temperature?
Lighting

- Energy efficient lamps and ballast
- Turn off the lights
- Occupancy sensors
Mechanical Cooling

- Thermal energy storage
- Variable flow pumps
- Minimum 20°F temperature rise
Process Load

- Research equipment?
- Water cooled equipment
Reheat

- Variable air flow
- Reset leaving air temperature
Future Energy Saving Ideas Being Considered
Future Energy Savers

- Reduce minimum air changes
- Review light levels
- Automatic sash closers
- Low-flow fume hoods
Future Energy Savers

- Machine room-less elevators
- Energy efficient lab refrigerators and freezers
- Water cooled compressor
- Radiant ceiling cooling