

REDUCE ENERGY BILLS AND IMPROVE YOUR BOTTOM LINE BY APPLYING ENERGY COST REDUCTION MEASURES (ECRMs)

<i>ECRM TYPE</i>	<i>ECRM DESCRIPTION</i>	<i>ECRM TYPE</i>	<i>ECRM DESCRIPTION</i>
POWER	Install fuel cells with heat recovery	HVAC	Combine chillers in multiple buildings - run most efficient first
	Cogeneration - turbine/engine/HRSG/AbsChiller/TurbChiller/etc.		Isolate off-line chillers and cooling towers
	Building Commissioning or Recommissioning		Replace chillers with more efficient models, size for part loads
	Thermal Energy Storage		Air handling unit optimal start/stop
Use emergency generators for peak electric load shaving	Chiller condenser water temp setback (off outdoor air wetbulb temp)		
Install energy efficient electric transformers	Cold Deck Temp Reset w/ Humidity Override (Constant air volume only)		
ENVELOPE	Install doors/seals in loading dock areas		Duct static pressure reset w/ VAV air system
	Place vestibules around exterior entrances		Install programmable zone thermostats
	Improve wall or roof insulation - numerous techniques		Lower zone thermostat heating setpoint, raise cooling setpoint
	Exterior building shading - trees and plants		Mixed air temperature reset (constant air volume only)
	Wind protection	Occupancy sensors and VAV system - setback temps, shutoff boxes	
	High reflectance roofing material	Optimize chiller sequencing	
	Blower door test, seal envelope leaks	Outdoor temperature reset - chilled water or hot water	
	Exterior window shading devices	Reduce zone outdoor air using CO2 sensors	
	Improved window thermal performance - replace	Unoccupied zone temp setback or shutoff	
	Install solar window films	Night precooling	
Install storm windows	Optimize control of multiple towers with multi or variable speed fans		
AIR	Convert multizone or dual duct to variable air volume	Oversize cooling tower, lower condenser temps	
	Design displacement ventilation system	Use induced draft (axial fan) over forced draft (centrifugal) when possible	
	Exhaust Air Heat Recovery	Use two-speed or variable-speed fan instead of water bypass to modulate capacity	
CHILLERS/ BOILERS	Insulate air ducts in unconditioned spaces	Desiccant Dehumidification	
	Combustion air preheating	Convert constant flow air or water to variable flow, where loads vary	
BOILERS	Improve water treatment to eliminate heat exchanger fouling	Oversize ducts and pipes to reduce fan/pump energy	
	Install multiple high-efficiency condensing boilers	Reduce flowrates in air and water systems where ever possible	
	Isolate off-line boilers	Replace electric resistance heating with other	
	Preheat feedwater with recovered heat	Indirect evaporative cooling	
	Replace and resize boilers for efficiency	Air-side economizers	
	Replace central plant with satellite boilers	Waterside economizers	
	Replace satellite boilers with central plant	Gas engine or absorption chillers	
	Shut down large boilers in summer and use small ones		



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University of Illinois • 1 E. St. Mary's Road, Champaign, IL 61820 • 1-800-214-7954

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ECRM TYPE	ECRM DESCRIPTION
	High Efficiency Gas Furnace
	Ground Source Heat Pumps
	Water loop heat pump systems - inside building - simultaneous htg/clg
	Heat Recovery - General
	Laboratory Fume Hoods: Low-flow, vav, or heat recovery
	Create air movement with fans
	Install roof-spray cooling systems - need low wetbulb temps
	Install or replace with premium efficiency
	Replace significantly under-load motors with correct motor size
	Specify or replace high efficiency packaged equipment
	Pump impellor trimming
	Fix steam condensate being dumped to drain
	Install or improve insulation on steam lines
	Investigate lowering steam system pressures
	Survey and fix any steam leaks
	Survey and replace failed steam traps
	Replace window air conditioners with central system
LIGHTING	Occupancy Sensors
	Rewire lighting to allow portions of circuit to be shut off
	Daylighting and dimming systems
	LED Exit Signs
	Exterior/Parking Lot Lighting
	High Bay Metal Halide to T8 or T5 conversion
	Incandescents to Compact Fluorescents
	Reduce illumination levels in overlit areas
	Install skylights and light dimming system
	T8 Lamps and Electronic Ballasts - specify or replace T12/magnetic
	Use task lighting with low ambient illumination
EQUIPMENT	Computers - power management systems

ECRM TYPE	ECRM DESCRIPTION
	Office Equipment - purchase energy efficient
	Plug load occupancy sensors
	Plug leaks, reduce system pressure
	Recover waste heat from compressor cooling system
	Insulate floors of walk in coolers if slab extends beyond cooler
	Purchase more efficient systems - cases, compressors, etc
	Use geothermal heat pump to dump refrigerant heat
	Vending Misers
	Install covers on swimming pools
	Shut anything off when not in use.
RENEWABLE ENERGY	Install wind turbines where feasible
	Photovoltaics
	Solar wall to preheat air for high-bay type buildings
	Use solar thermal systems for heat loads
WATER	Water conserving dishwashers
	Heat recovery from/to irrigation water
	Use soil water sensors and/or efficient distribution systems
	Faucet Aerators
	Install automated faucets and flush valves
	Low Flow Shower Heads
	Rainwater harvesting
	Waterless Urinals
	Water conserving dishwashers
	Gray Water Heat Recovery
	Hot water using recovered heat (such as from chiller condenser)
	Instantaneous hot water heaters (gas or electric)
	Additional insulation on water heaters (heater blankets)
	Insulate hot water pipes