APPENDIX A – MASTER LIST OF ENERGY CONSERVATION OPPORTUNITIES

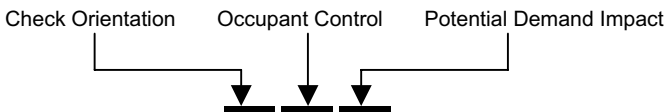
The following list of Energy Conservation Opportunities (ECO) is presented as a guide and should be reviewed prior to designing a new building or modifications/renovations to existing building. For each strategy three categories are shown: check orientation, occupant control, and potential demand impact. A white dot indicates which of these categories is applicable, and a black square indicates little relationship. The first category, check orientation, is intended to mark strategies with energy performance strongly affected by building orientation. The second occupant control, is for strategies that depend on proper operation by the occupants of a building for maximum effectiveness.

Potential demand impact is intended to indicate, only as a starting point, strategies which may help reduce the demand charge for electricity. In general, demand strategies that either (1) shift the usage of electricity to less critical times or (2) contribute to the reduction of the total peak load (KW). It is difficult to generalize about these since they are usually dependant on the architectural and mechanical characteristics, usage patterns, and rate structures for each project.

LIGHT

	Check Orientation	Occupant Control	Potential Demand Impact
Use Available Light			
Size and Locate Glazing for Visual Tasks	●	○	○
Vertical Glazing	●	○	○
Light Shelf	●	○	○
Clerestory	●	○	○
Sawtooth Roof	●	○	○
Sloped Glazing	●	○	○
Roof Monitor	●	○	○
Light Well/Atrium	●	○	○
Open Courtyard	●	○	○
Increased Interior Reflectance	○	○	○
Increased Exterior Reflectance	○	○	○
Glazing with High Visible Transmittance	○	○	○
Diffusing Glazing	○	○	○
Open Plan	○	○	○
Locate Spaces According to Visual Comfort	●	○	○
Increased Ceiling Height	○	○	○
Stepped Building Plan/Section to Collect Light	●	○	○
Reduce Use of Electric Lights			
Dimming Controls	○	○	●
Selective Switching	○	●	●
Infrared Sensors	○	○	●
Timers for Unused Areas	○	●	●
Task Lighting	○	●	○
Sensors, Timers for Security Lighting	○	○	●
Low Brightness Luminaire	○	○	○
Improved Maintenance	○	●	○
High Intensity Discharge Fixtures	○	○	○

COOL



Reduce Heat Gains

	Check Orientation	Occupant Control	Potential Demand Impact
Reduce Number of Fixtures with Improved Layout	●		
Locate Building in Shade	●		
Reduce Glass Exposed to Sun	●		
Overhang	●		
Stepped Plan/Section for Self-Shading	●		
Heat-Absorbent Glazing	●		
Reflective Glazing	●		
Exterior Fins	●	●	
Interior Blind/Drapes	●	●	
Blinds between Glazings	●	●	
Reduce Surface/Volume Ratio			
Deciduous Plant Materials	●		
Vented Roof Section			
Increased Building Reflectance			
Shade Adjacent Exterior Surfaces	●		
Radiant Barriers	●		
Increased Insulation			
Earth Integration			
Exhaust Heat from Lights			
Reduce Heat from Lights			
Equipment Heat Exhaust			
Decentralized Internal Heat Sources			
Shade System Air Intake	●		
Wing Walls	●		
In/Exfiltration Reduction Techniques			

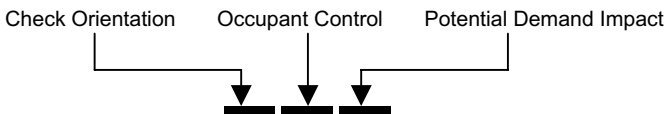
Use Available Heat Sinks

	Check Orientation	Occupant Control	Potential Demand Impact
Economizer Cycle			
Cooling Tower			
Indirect Evaporative Cooler			
Dessicants			
Active Solar Absorption Chiller	●		
Ground Water Heat Pump			
Internal Mass			
Operable Window	●	●	
Ceiling Fans		●	
Exhaust Fans		●	
Create Chimney Effect with Building Section	●		
Site Building to Induce Air Flow	●		
Use Water Features to Reduce Outside Air Temperature			

Store Cold for Later Use

	Check Orientation	Occupant Control	Potential Demand Impact
Chilled Water Storage			●
Ice Storage			●

HEAT



Reduce Heat Loss

	Check Orientation	Occupant Control	Potential Demand Impact
Increase Insulation	■	■	■
Reduce Glazing Area	●	■	■
Movable Insulation	●	●	■
Earth Integration	■	■	■
Multiple Glazing	■	■	■
Avoid Thermal Bridges	■	■	■
Reduce Surface/Volume Ratio	■	■	■
Locate Spaces According to Thermal Comfort	●	■	■
Site Building out of Winter Winds	●	■	■
Airlock Entry Vestibule	●	■	■
Fixed Glazing	■	■	■
Continuous Vapor Barrier	■	■	■
Caulking & Weather stripping	■	■	■

Use Available Heat Sources

Direct Gain Glazing	●	■	■
Solar Wall Heaters	●	■	■
Indirect Gain Glazing	●	■	■
Sunspace	●	■	■
Active Solar Systems	●	■	■
Increase Building Absorptivity	●	■	■
Recover Heat from Lights	■	■	■
Recover Heat from Equipment	■	■	■
Use Excess Heat from within Building	■	■	■
Biomass Fuels	■	■	■

Store Heat for Later Use

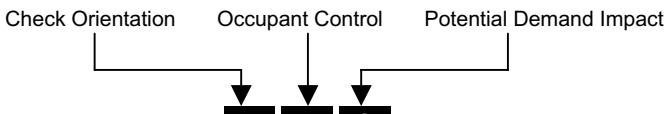
Masonry/Water Storage	●	■	■
Phase Change Materials	●	■	■
Hot Water Storage	■	■	●

SYSTEM

Reduce Load

Low Leakage Outside Air Intake Dampers	■	■	○
Ventilation Air Control Based on Occupancy	■	■	●
Reduce Minimum Outdoor Air	■	■	●
Designated Kitchen Exhaust Hoods	■	■	○
Exhaust Fan Controls (Thermostats, Dampers)	■	■	○
Coil Runaround Cycle	■	■	○
Latent Heat Recovery	■	■	○
Reduce Static Pressure	■	■	○
Electronic Air Filters	■	■	○
Duct Insulation	■	■	○
Don’t Condition Unused Areas	■	■	●

SYSTEM



Reduce Load

Eliminate, Relocate, or Reduce Preheat Coil	■	■	●
Reset Coil Temperatures	■	■	■
Use Load Analyzers in Reheat Systems	■	■	■
Cooling Tower Bypass Valve	■	■	■

Reduce Operation

Duty Cycling	■	■	●
Time of Day Load Cycling	■	■	●
Equipment Scheduling	■	■	●
Dead Band Thermostat	■	■	●
Concealed Thermostats/Controls	■	●	■
Night Setback Thermostat/Morning Warm-Up Control	■	■	●
Optimal Start/Stop Strategy	■	■	●

Reduce Power Required

Efficient Motors, Pumps	■	■	■
Fan Volume Controllers	■	■	●
Size Plant for Part Load Performance	■	■	●
Baffles to Improve Broiler Performance	■	■	■
Blowdown Control/Heat Recovery	■	■	■
Flue Gas Analysis	■	■	■
Modular Broilers/Chillers with Sequencing	■	■	●
Preheat Feedwater/Combustion Air	■	■	■
Alternate Fuel Source	■	■	■
Alternate System	■	■	●

HOT WATER

Reduce Load

Pipe/Tank Insulation	■	■	■
Water Conserving Fixtures	■	■	■
Point of Use Heaters	■	■	■
Reduce Thermostat Setpoint	■	■	■

Reduce Operation

Controls/Timers	■	■	●
Duty Cycling	■	■	●
Time of Day Load Cycling	■	■	●

Use Available Heat Sources

Solar Collectors	●	■	■
Heat Pump	■	■	■
Heat Recovery	■	■	■
Solar Augmented Heat Pump	●	■	■

Source: Energy Design Guidelines, Tennessee Valley Authority