

ENGINEERING METRICS CHECKLIST

EVALUATION

PERFORMANCE

OPERATION

IMPROVEMENT

UTILITY BILLS		
ACTION STEPS	TIMELINE	NOTES
<p>Review energy bills for accuracy and assess the building's performance</p> <ul style="list-style-type: none"> • Compare meter readings to billing data • Double-check rates and tariff schedule • Compare to prior months and same period in prior year to uncover any unusual variances (and determine whether variances are explained by vacancy, weather, etc., which are factored into the ENERGY STAR rating) • Calculate the average blended rate (total charges on the bill divided by total consumption – can be used to estimate potential savings from energy efficiency projects) • Identify when the peak demand occurs during the day • Identify opportunities for the building to perform load-shedding • Explore load-shedding programs offered by the electric utility company 	Monthly	
<p>Review water and sewer bills</p> <ul style="list-style-type: none"> • Verify that water used in irrigation systems and cooling towers are separately metered • Compare to prior months and same period in prior year to uncover any unusual variances 	Once Monthly	
<p>MONITOR AND REPORT ON THE FOLLOWING METRICS MONTHLY, BASED ON THE ABOVE ACTION STEPS:</p> <ul style="list-style-type: none"> ➤ Rolling 13-month report showing electricity consumption, costs, average blended rate, and peak demand charges ➤ Rolling 13-month report showing water / sewer consumption and costs and average blended rate ➤ Comments explaining any major variances in utility usage or costs (unless these variances are normalized by the ENERGY STAR rating) 		

BUILDING SYSTEMS / OPERATIONS AND SCHEDULING		
ACTION STEPS	TIMELINE	NOTES
<p>Calculate plug load, HVAC load, and lighting load to create a demand profile, in order to determine where energy is used the most</p> <ul style="list-style-type: none"> • Identify when each system typically runs, including weekends and holidays • Calculate cumulative watts or horsepower of all related equipment • Determine approximate load percentages of each set of building systems • Complete electricity demand profiles for each season to capture fluctuations 	Quarterly	
<p>Monitor load profiles of each system over time to look for problems</p> <ul style="list-style-type: none"> • Utilize EMS trend logging to diagnose the cause of energy waste 	Monthly	
<p>Utilize the building's energy demand profile above to match building HVAC and lighting schedules to actual building occupancy and tenant needs</p> <ul style="list-style-type: none"> • Identify where actual consumption varies from pre-set time schedules and programs • Determine optimal schedule of operations • Determine how long it takes the building to start up in the morning • Identify when systems are turning off at night • Based on trend logging, determine optimal start and stop times 	Monthly	
<p>Verify that schedules are optimized and systems are actually operating according to the schedule</p> <ul style="list-style-type: none"> • Review trend logs of actual consumption to verify that energy consumption matches time schedules or the programs of other building control systems • Review and optimize schedules • If trend logging data is not available, periodically visit the building after-hours to determine if lights and equipment are turning off appropriately • Calibrate thermostats, motion sensors, and other devices that affect the building's ability to operate according to set parameters • Identify tenant "shadow space" – or recently unoccupied areas of the building that may be shut down temporarily to save energy. 	Monthly Quarterly Quarterly Quarterly Quarterly	
MONITOR AND REPORT ON THE FOLLOWING METRICS, BASED ON THE ABOVE ACTION STEPS:		
<ul style="list-style-type: none"> ➤ Provide monthly trend logging report for plug load, HVAC load and lighting load ➤ Report against a targeted decrease ➤ Explain any variances in loads or changes that were made to operational schedules 		

ENERGY MANAGEMENT SYSTEMS		
ACTION STEPS	TIMELINE	NOTES
<p>Evaluate how the EMS is being used</p> <ul style="list-style-type: none"> • Determine what features the EMS is capable of • Confirm which are being used • Determine which pieces of equipment the EMS controls • Develop and implement strategies for maximizing the use and benefits of the EMS • Identify training opportunities for staff • Evaluate costs/benefits of upgrading the EMS or adding new features 	<p>Annually Annually Annually Quarterly Quarterly Annually</p>	
<p>Create manual protocols for equipment / operations not supported by the EMS system</p> <ul style="list-style-type: none"> • Use trend logging information to determine the optimal building start-up and shut-down times. 	<p>Quarterly</p>	
<p>MONITOR AND REPORT ON THE FOLLOWING METRICS, BASED ON THE ABOVE ACTION STEPS:</p>		
<ul style="list-style-type: none"> ➤ Compare daily startup and shutdown times to the prior year ➤ Record quarterly /annual reports on training/troubleshooting/testing of systems ➤ Assess EMS effectiveness quarterly/annually based on manufacturer/installer optimized metrics 		

BENCHMARKING AND TRACKING		
ACTION STEPS	TIMELINE	NOTES
<p>Benchmark energy performance in ENERGY STAR's Portfolio Manager (www.energystar.gov)</p> <ul style="list-style-type: none"> • Enter/update building occupancy, utility consumption and costs into ENERGY STAR's tracking tool • Review energy performance data in Portfolio Manager to monitor changes • Investigate when the energy performance rating or energy intensity fluctuates by five percent in either direction 	Monthly	
MONITOR AND REPORT ON THE FOLLOWING ENERGY STAR METRICS EACH MONTH TO PROVIDE A PICTURE OF HOW EFFICIENTLY THE BUILDING IS OPERATING:		
<ul style="list-style-type: none"> ➤ ENERGY STAR rating ➤ Energy intensity ➤ Written explanation for any variances exceeding 5% either up or down ➤ Progress against established goals 		
TEAM QUALIFICATIONS		
ACTION STEPS	TIMELINE	NOTES
<p>Assess skills and capabilities of in-house engineering team</p> <ul style="list-style-type: none"> • Utilize reports and metrics developed above to determine where performance needs to be improved • Identify knowledge gaps between building needs and engineering capabilities • Identify equipment maintenance currently contracted out and why it is not performed in-house 	Annually	
<p>Create a training plan</p> <ul style="list-style-type: none"> • Identify training needs of in-house engineering team based on skills assessment • Identify training that may enable outsourced maintenance work to be done in-house • Determine where training can be obtained 	Annually	
REVIEW STAFF PERFORMANCE AND REPORT ON THE FOLLOWING METRICS ANNUALLY:		
<ul style="list-style-type: none"> ➤ Number and type of training hours ➤ Other reports to utilize to assess performance gaps: <ul style="list-style-type: none"> a. Response time to tenant requests b. Number of repeat tenant requests c. Customer surveys d. Vendor suggested performance metrics relating to equipment/systems e. Frequency of unplanned/unexpected equipment failure 		