



ENERGY MANAGEMENT GUIDEBOOK

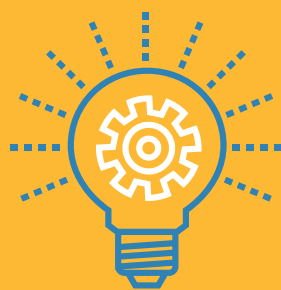


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WHO IS THIS GUIDEBOOK FOR?

This guidebook is a general guidebook that can be used by any organization (governmental, commercial, industrial) seeking to improve energy performance.

It can be used by higher management, operations managers, engineers, and all others trying to establish their energy conservation plan to manage energy consumption.

INTRODUCTION TO ENERGY MANAGEMENT

World energy consumption is on the rise due to urbanization, industrialization and growth in population. That puts enormous pressure on our resources and environment.

**Energy conservation should be a priority for everyone,
as a nation, as companies and individuals.**

What are the benefits to energy conservation?

ECONOMIC

helps organizations save money
by reducing energy costs thereby
increasing profitability



ENVIRONMENTAL

reduces emissions of carbon dioxide
and other greenhouse gases (GHGs)
and slows down the global warming
and climate change



SOCIAL

helps organization improve their
brand reputation and social
responsibility



Zoom in on Dubai Energy Saving Targets

Dubai Supreme Council of Energy (DSCE), chaired by His Highness Sheikh Ahmed Bin Saeed Al Maktoum, developed the **Dubai Integrated Energy Strategy (DIES 2030)** to set the strategic direction towards secure and sustainable energy supply and demand. As part of this strategy, energy demand is addressed with the **Dubai Demand Side Management Strategy (DSM 2030)**.

المجلس الأعلى للطاقة
Supreme Council of Energy



30%
by
2030

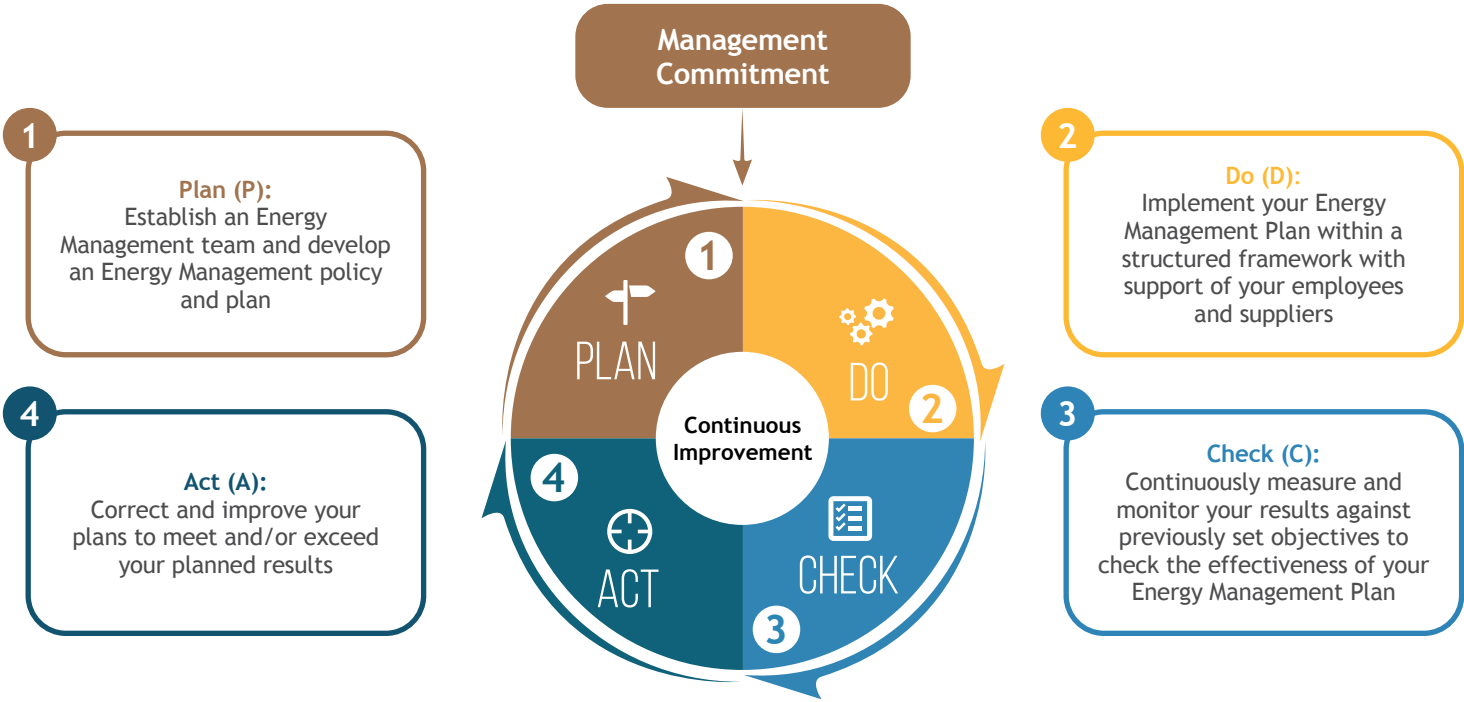


The **Demand Side Management Strategy** sets an ambitious goal to reduce electricity and water consumption in Dubai, **30% by 2030** vs. business as usual, and to make Dubai a role model in energy efficiency by implementing cost effective electricity and water demand saving programs and developing a green service market.

Energy Management Systems (e.g. ISO 50001)

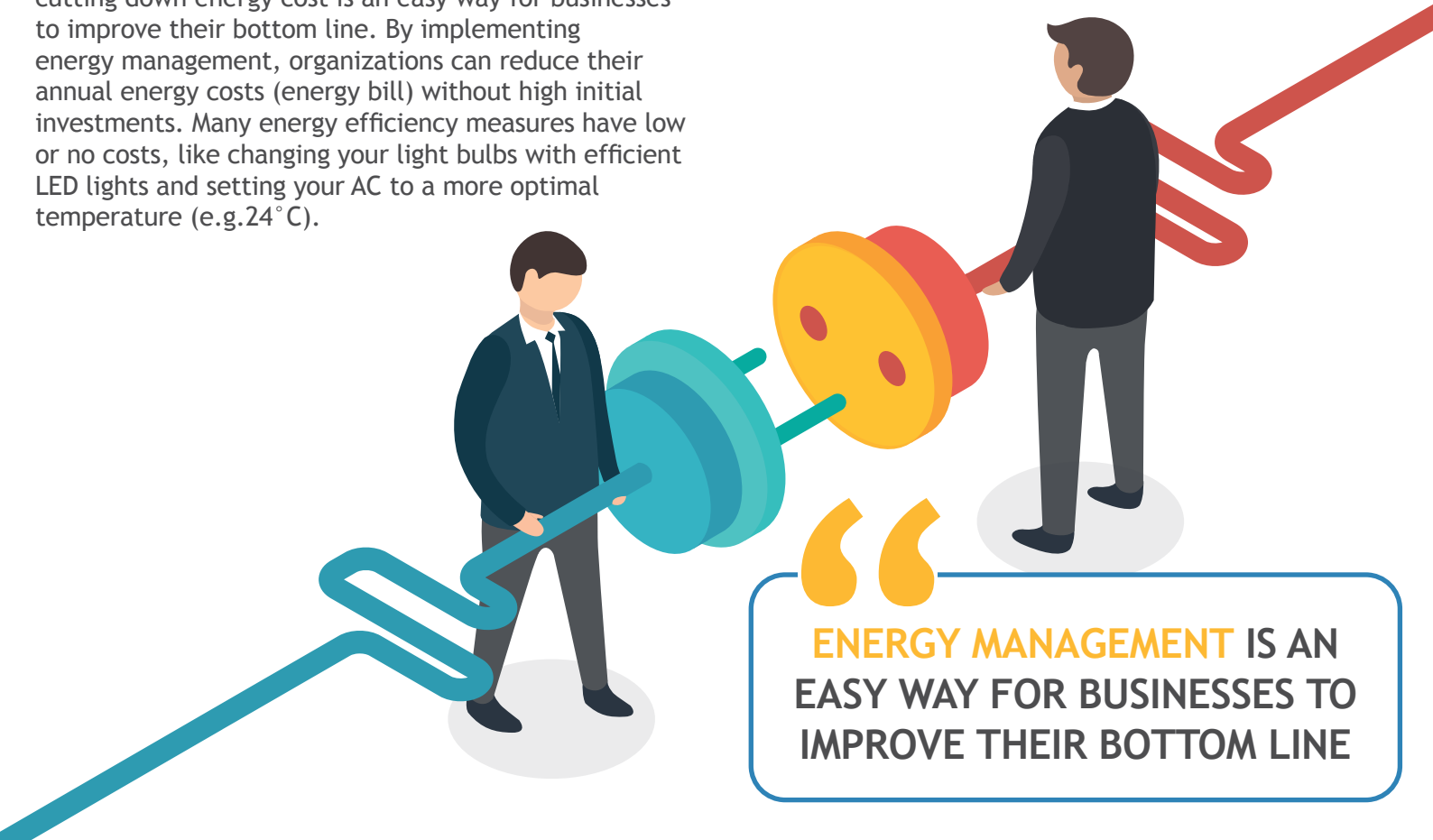
An Energy Management System helps and supports organizations in all sectors to use energy more efficiently, through the development and implementation of an Energy Management Plan, irrespective of size, activity, or geolocation.

The PDCA: Plan - Do - Check - Act cycle is a four-step model for carrying out change energy management. The circular flow ensures continuous improvement.



INTRODUCTION

Improving organizations energy performance and cutting down energy cost is an easy way for businesses to improve their bottom line. By implementing energy management, organizations can reduce their annual energy costs (energy bill) without high initial investments. Many energy efficiency measures have low or no costs, like changing your light bulbs with efficient LED lights and setting your AC to a more optimal temperature (e.g. 24°C).



ENERGY MANAGEMENT IS AN
EASY WAY FOR BUSINESSES TO
IMPROVE THEIR BOTTOM LINE

Key Benefits of Energy Management for your Organization



Save money on your energy bill and manage risks by reducing operating costs and exposure to future energy price increases



Comply with policies and regulatory frameworks



Enhance productivity, competitiveness, and market position



Improve organizational efficiency and corporate social responsibility (CSR)



Exploit new and growing market opportunities by introducing new smart technology

BEFORE YOU START

Energy management approach varies between organizations, but it typically starts with an individual taking initiative and asking questions about energy use. Without active intervention, energy performance of an organization cannot improve.

No matter the size or type of your organization, the **common ingredient for successful implementation of Energy Management is management commitment.**

Obtain commitment from your top management to:

- ▷ **Integrate** energy policies and the Energy Management Plan **into company core operations**
- ▷ **Secure funding** for the implementation of the Energy Management Plan (e.g. installation and maintenance of the equipment), if needed
- ▷ **Establish** an energy management **team** to implement the Energy Management Plan
- ▷ **Provide** staff with energy management **training**
- ▷ **Conduct management reviews** of energy management reports

Strong leadership from board-level directors and senior management can motivate employees to get actively involved in the process and to understand their role. More importantly, senior management support allows for organization-wide changes to be implemented.

To convince your management to support energy management, you need to prepare a strong business case. The business case should showcase the potential energy savings and investments, identified through your analysis (see planning phase on the page 15).

The business case needs to be clear, comprehensive, and adapted to the target audience - your management. It needs to be presented in simple terms, with each of the headlines backed up with technical and financial details.

A convincing business case should highlight:

- ▶ Importance of energy management for your organization
- ▶ Comprehensive list of benefits (e.g. potential improvements achieved with certain measures)
- ▶ Estimated energy and monetary savings
- ▶ Estimated cost of implementation
- ▶ Potential risks and mitigation measures
- ▶ Proposed timetable





Know How

How to write your business case?

- ▶ Be simple, clear and concise - management's time is valuable
- ▶ Have a clear proposal culminating in a single recommendation
- ▶ First present the summary and then all the appropriate analysis of potential measures, costs, benefits, risks and timetable
- ▶ Use images and charts to help communicate where possible
- ▶ Avoid jargon and abbreviations

Your management might not have strong technical knowledge about energy efficiency. Focus on explaining: **“Why should we do this?”** **“How much will it cost?”** **“How will it benefit us?”**

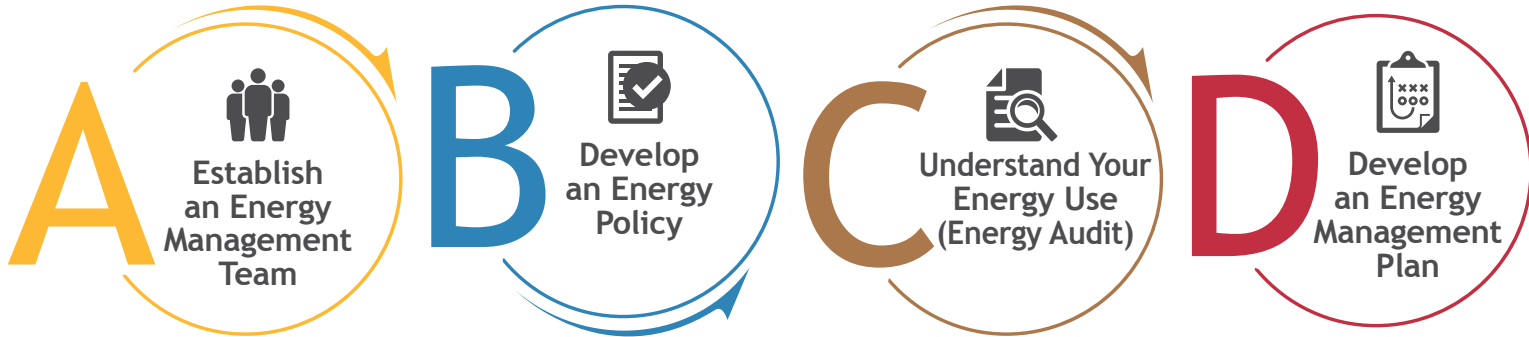


Tips

- ▶ Show successful case studies from other similar organizations. This can be helpful in sourcing the potential energy conservation measures and other opportunities focusing on benefits and costs
- ▶ Present low or no cost measures as they are appealing to the management
- ▶ Present the cost of inaction - potential losses generated by delaying the implementation of the energy conservation measures
- ▶ Enhance your proposals attractiveness by adding benefits like: increased availability and reliability of key equipment, reduced operation and maintenance cost, reduced noise and emissions and enhanced reputation and CSR advantages

THE KEY OUTCOME
OF PRESENTING A SUCCESSFUL BUSINESS
CASE IS OBTAINING MANAGEMENT'S
BUY IN AND ALLOCATION OF NECESSARY
RESOURCES AND BUDGET







Establish an Energy Management Team

Once you obtain support and buy-in from management, it is recommended to **ESTABLISH A DEDICATED ENERGY MANAGEMENT TEAM** to develop and implement the Energy Management Policy and Plan.



Assign an **Energy Management Director**, an effective leader and a decision maker who is empowered by the top management and across departments, to:

- Be the focal point with management and lead the team
- Set goals, track progress, and communicate results
- Coordinate and lead awareness efforts
- Ensure accountability and commitment for the implementation of the Energy Management Plan



Establish a **Working Team** to execute the Energy Management Plan across different parts of the organization. The team should include:

- An energy manager with comprehensive knowledge of energy efficiency. Preference should be given to a person with an Energy certification (e.g. Certified Energy Manager - CEM®)
- A facility manager with operations and maintenance responsibilities
- A member of finance and/or purchasing department
- A communication officer



Appoint a **Champion/Sponsor**

- From senior management to raise the profile and commitment to energy management in your organization
- This role can be assigned to a HR/ Communication Department or an enthusiastic team leader who can work on awareness and integration of energy management into the organization's corporate culture





Develop an Energy Policy

Check if your organization has an **ENERGY POLICY**, a document that sets the ground rules for the Energy Management Plan. If your organization does not have an established Energy Policy, it is recommended to develop one. An Energy Policy provides the foundation for successful energy management. It formalizes top management support and commitment.

Key elements of Energy Policy:



Management commitment - includes a message from the top management with a commitment to the policy objectives and goals as well as regular policy review



Action plan - specifies timeline, resources, roles and responsibilities in the organization



Clear objective and goals - reflect the organization's commitment (e.g. Our organization has a target of 20% energy reduction by the end of next year)



Policy review - includes process for measuring progress, defining milestones and mechanisms to define needed updates of policy priorities and targets

An organization's energy policy serves as a reference document to develop the Energy Management Plan, and it contains the organization's high level mission statements regarding energy. Once the policy is developed, it should be circulated by management to the full organization to ensure awareness at all levels.

"Our organization has set the target of 20% of energy consumption reduction by 2030..."

"We support the purchase of energy efficient equipment and services"

"The Energy Management Plan will be developed and implemented by the team below:
Energy Management Director,
Senior Manager..."

"...policy needs to be continuously reviewed and updated to reflect the changes in needs and priorities..."

ENERGY POLICY

Commit to comply with applicable legal and other requirements

Document and communicate within the organization

Name of the top management and signature





Understand Your Energy Use (Energy Audit)

An energy audit (also called an “energy review” or “energy assessment”) is the first step to making your facilities and operations more energy efficient. The purpose of an energy audit is to **understand your organization’s energy use** and **determine where, when, why and how energy is used in a facility in order to identify opportunities to improve energy performance.**

The main outcome of an energy audit is a **list of recommended energy conservation measures (ECMs)**, their associated energy savings, and an assessment of whether ECM installation costs are financially viable.



**YOU CANNOT MANAGE
WHAT YOU DO NOT UNDERSTAND**

There are two ways to conduct an energy audit:

- ▷ **Do It Yourself (DIY)** - The simple, walk through audit can be conducted internally, defining low-cost / no-cost measures and potential capital improvements. The energy manager/auditor (from your energy management team) leads the audit process, but works closely with facility management staff and other key participants to ensure accuracy of data collection and appropriateness of energy conservation measures
- ▷ **Get Professional Support** - More rigorous energy analysis that include: financial analysis and cost estimates are offered by ESCOs - Energy Service Companies, energy auditors, energy consultants, or engineering firms

Professional Support for Energy Audits



مكتب التنظيم والرقابة لقطاع الكهرباء و المياه
RSB FOR ELECTRICITY & WATER

The list of Dubai accredited ESCOs and Energy Auditors is available on Regulatory and Supervisory Bureau of Dubai (RSB) website

LIST OF ACCREDITED ESCOS

<https://www.rsbdubai.gov.ae/esco/list-of-accredited-escos/>

LIST OF ACCREDITED ENERGY AUDITORS

<https://www.rsbdubai.gov.ae/energy-auditors/>

Whether you choose to conduct an energy audit internally or with the help of professionals, the audit will follow similar steps and should identify:

- Energy consumption patterns (incl. peak consumption periods)
- Most energy intensive areas or processes
- Cost-effective energy conservation actions and measures
- Action plans for energy efficiency capital investments





Notes

ASHRAE Types of Energy Audits

▶ ASHRAE Level 0: Preliminary Energy Use Analysis

Analysis of historic energy consumption and cost defines Energy Use Index (EUI) and Energy Cost Index (ECI). Comparing facility's EUI and ECI to similar facilities helps determine if further study is likely to produce energy savings. If there are meaningful potential energy savings, next step is to conduct Level 1 (Walk Through Analysis).

▶ Level I: Walk-Through Analysis

It is also known as “one-day” audit. It assesses facility's current energy cost by analyzing energy bills in detail, and it also assesses efficiency of major equipment and appliances. During the walk through the facility, energy auditor interviews facility staff and building operator to find out if there are any issues or challenges with equipment or its way of use. The Level I analysis identifies low-cost/no-cost measures called Energy Conservation Measures (ECMs) and capital improvements along with an initial estimate of costs and savings that will be used in the further study.

▶ Level II: Energy Survey and Analysis

It includes more detailed analysis, including a breakdown of energy use, more detailed energy calculations, and cost identification of defined ECMs. Energy usage is analyzed over a longer period of time.

▶ Level III: Detailed Analysis of Capital-Intensive Modifications

This involves more detailed field measurement & analysis and it focuses on potential capital-intensive projects identified during ASHRAE Level II. This level of audit provides certainty in major capital investment decisions.

▶ Investment Grade Audit (IGA)

It is usually done during Level III (sometimes during Level II). It includes computer simulations, enhanced financial analysis (e.g. life cycle costing), assessment of financial risks, and other analysis. The main objective of IGA is to obtain funding for the implementation of identified ECMs.

HOW TO CONDUCT AN ENERGY AUDIT:

Before entering the facility it is important to **conduct a Preliminary Energy Use Analysis (PEA)** in order to understand current and past energy use. This is how many organizations identify opportunities to improve energy performance and gain financial benefits.

- 1 **Calculate the gross floor area** - Detect all spaces that use energy (excluding covered walkways, porches, garages, etc.) and sum them up. It is recommended to measure from exterior places of walls to inside
- 2 **Collect 1 or 2 years of monthly energy bill** - Collect energy bills, meter readings and all usable data that can define consumption patterns and answers questions like: When are the peaks in the organization's consumption? Is the water use unexpectedly higher in certain months?

WE RECOMMEND GETTING PROFESSIONAL SUPPORT FOR THE NEXT 3 STEPS

- 3 **Calculate energy intensity of the facility** - The energy used in the facility per square meter of space defines energy intensity (e.g. kWh/sqm) which is a basic measure of a facility's energy performance. Comparing energy intensities of similar facilities helps set targets. Check out www.myenergymyresponsibility.ae/EUI-calculator (based on Emirates Green Building Council study).
- 4 **Conduct benchmarking of energy indices with similar buildings** - Set the energy efficiency target of the building in light of the energy indices of the efficient similar buildings.
- 5 **Compare energy and cost savings** - if it reaches the target energy intensity

- 6 **Walk through the facility** - Note down all building features, major equipment, operation and maintenance (O&M) procedures.

Quick example:

End use or Process	Number of items	MWh/year Gallons/year	% of total consumption	Uncertainty +/- %	Source of information	Planned improvement
AC Unit - Window						
Lighting - Incandescent						
Lighting - LED						
Process equipment						
Process - Chipper mill						
Other						

Tips: For industrial sector it is recommended to also show the energy use by processes

- 7 ▶ **Meet with the staff** - Review all planned building improvements, O&M issues and equipment upgrades
- 8 ▶ **Conduct space function analysis** - Are all functions the same as original intent?
- 9 ▶ **Record low-cost/no-cost energy conservation measures** - through changes to facility or to O&M procedures
- 10 ▶ **Estimate approximate savings** - that can be achieved by applying defined ECMs (ensure that the estimate savings align with your targets set in the steps 3-5 and/or Energy Policy)



Tips

- ▶ If possible, use actual, metered data, not estimates
- ▶ Data should be complete and accurate as it will be used for analysis and target setting
- ▶ Account for all energy sources: All purchased and generated energy e.g. electricity, gas, steam, waste fuels, water in all energy units and on a cost basis



Notes

When making specific energy changes to equipment, processes, or workspaces, ensuring that all employees are aware of the nature of the changes and reasons behind them is critical. All employees need to know how and when their workplace will be affected. Also, it is important to highlight any required trainings for retrofitted or new equipment.

KEY AREAS TO BE ANALYZED:



Heating, Ventilation and Air Conditioning (HVAC)

In Dubai, air conditioning (AC) accounts for **an annual average of about 50%** of the electricity use. Due to increased heat gains from poor insulation, lighting, staff and equipment, ventilation and cooling system have to work harder to maintain the desired temperature and air quality (humidity and CO₂ levels).

While doing an audit always check:

- ▷ **Age of the system** - system efficiency significantly degrades as the system ages
- ▷ **Maintenance schedule** - it should be maintained regularly (e.g. filters have to be cleaned at least 2 times per year)
- ▷ **Type/capacity of AC** - Check if the AC capacity matches your cooling needs
- ▷ **Specifications (e.g. Energy Efficiency Ratio, ESMA Energy Label)** - when available, check the star rating of your AC based on the Integrated ESMA Efficiency Label (the more stars it has - the more efficient it is)
- ▷ **Temperature** set-points and comparison with relevant local standards
- ▷ **Fresh air usage and CO₂ levels**



Notes

District cooling is the centralized production and distribution of cooling. Chilled water is delivered through an underground insulated pipeline to office, industrial and residential buildings to cool the indoor air of the buildings within a district. Specially designed units in each building then use this water to lower the temperature of air passing through the building's air conditioning system. **District cooling is almost 40% more energy efficient than other cooling solutions.** It is recommended to always explore the option of cooling your facility using district cooling or high efficiency water cooled chillers.

KEY AREAS TO BE ANALYZED:



Lighting (indoor and outdoor)

Lighting can be a **quick win** in your energy management journey. Significant savings can be achieved by **using the right lighting technology** (e.g. LED, smart, motion controls), ensuring proper maintenance and simple behavioral measures (e.g. turning off the lights during the day, using natural lighting as much as possible).

Lighting savings have a double impact, where efficient lights reduce lighting consumption and also reduce HVAC consumption since the cooling demand is reduced.

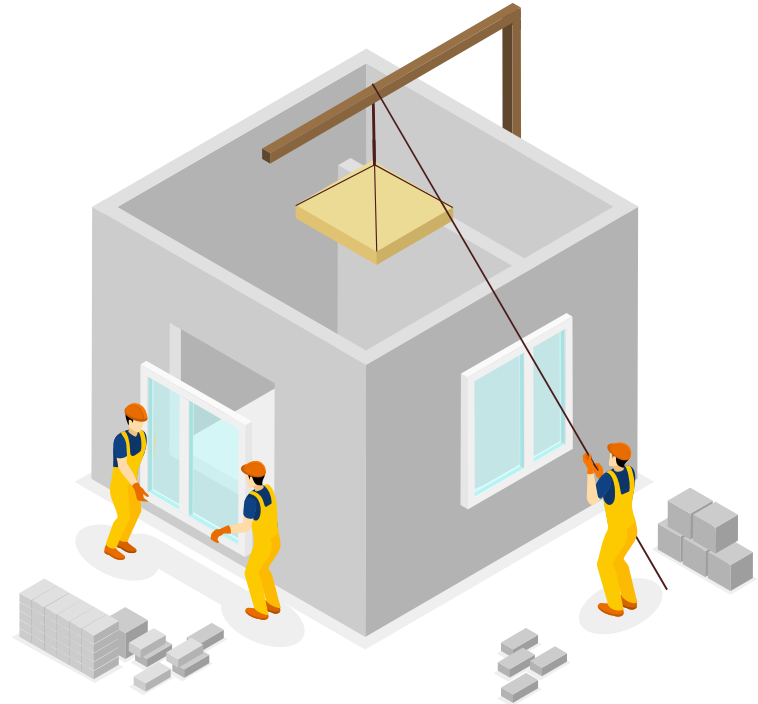


KEY AREAS TO BE ANALYZED:



Building envelope (e.g. windows, walls, ceiling)

Also known as the building shell, fabric or enclosure, it is the boundary between the conditioned interior of a building and the outdoors. The energy characteristics of building envelope components, including external walls, windows, doors, floors and roof, are important to determine how much energy is required for cooling (or heating). **Improving the building envelope and insulation lowers ventilation cost, reduces solar glare, drought and noise, and improves productivity.**



KEY AREAS TO BE ANALYZED:



Appliances, machines and electronics (e.g. water heaters, electric motors, data centers)

Appliances and machines account for a large portion of energy consumption. Determining how much electricity your appliances and electronics consume, can help you understand how much money you are spending to use them. **The energy label issued by ESMA (Emirates Authority for Standardization and Metrology) for UAE or similar for other countries (e.g. energy star for electronics, IEC ratings for motors) provides an estimate of the average energy consumption and allows you to easily calculate the cost to operate the appliance.**



هيئة الإمارات للمواصفات والمقاييس
Emirates Authority For Standardization & Metrology



It is recommended to choose 5 or 4 ESMA energy star rated appliances as they are more energy efficient.

KEY AREAS TO BE ANALYZED:

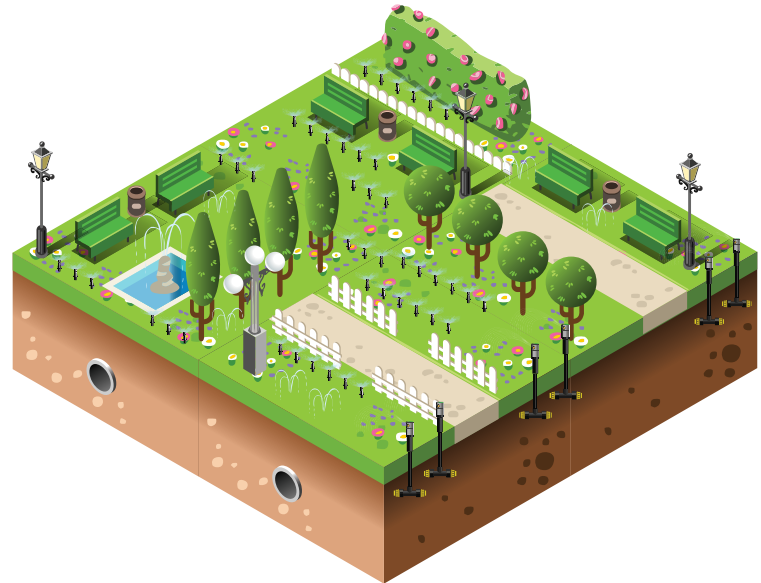


Water use (indoor and outdoor)

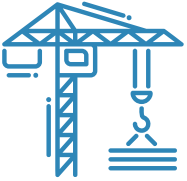
Effective water conservation planning seeks to “do more with less” without sacrificing comfort or performance. Water use differs based on the sector, however all facilities that practice proactive water conservation planning can save water and improve their bottom line.

Key areas to examine to understand and assess your water use include:

- ▷ **Water leakages** from water tanks, pipes or faucets
- ▷ **Flow rate** of water fixtures and faucets
- ▷ **Water consumption rates of water consuming appliances** (e.g. washing machines, dishwashers)
- ▷ **Irrigation systems**



KEY AREAS TO BE ANALYZED:



Sector specific processes

Buildings and industries are all unique. In the industrial sector, in addition to auditing the overall building systems (e.g. lighting, HVAC) additional focus should be put on the most energy-intensive processes.



KEY AREAS TO BE ANALYZED:



Renewable energy sources

An energy auditor should always explore the option of **generating energy from renewable sources** (e.g. installing solar PV systems).



هيئة كهرباء ومياه دبي
Dubai Electricity & Water Authority



شمس دبي
Shams Dubai



Shams Dubai is DEWA's first smart initiative to connect solar energy and supports the diversification of the energy mix by promoting the use of clean renewable energy sources.

The main goal is to have a solar panel on every roof in Dubai.

Care to know your building's solar potential? Shams Dubai Calculator is a DEWA web application that enables you to estimate the potential electricity production and savings

<https://www.dewa.gov.ae/en/builder/shams-dubai-guides-tools/solar-calc>

LIST OF APPROVED SOLAR CONSULTANTS AND CONTRACTORS

<https://www.dewa.gov.ae/en/consumer/solar-community/enrolled-contractors-consultants>



Notes

More information on how to understand and reduce your energy consumption can be found on www.MyEnergyMyResponsibility.ae



HOW TO SAVE ELECTRICITY AND WATER



ACTIVE CAMPAIGNS



GOVERNMENT INCENTIVES





Develop an Energy Management Plan

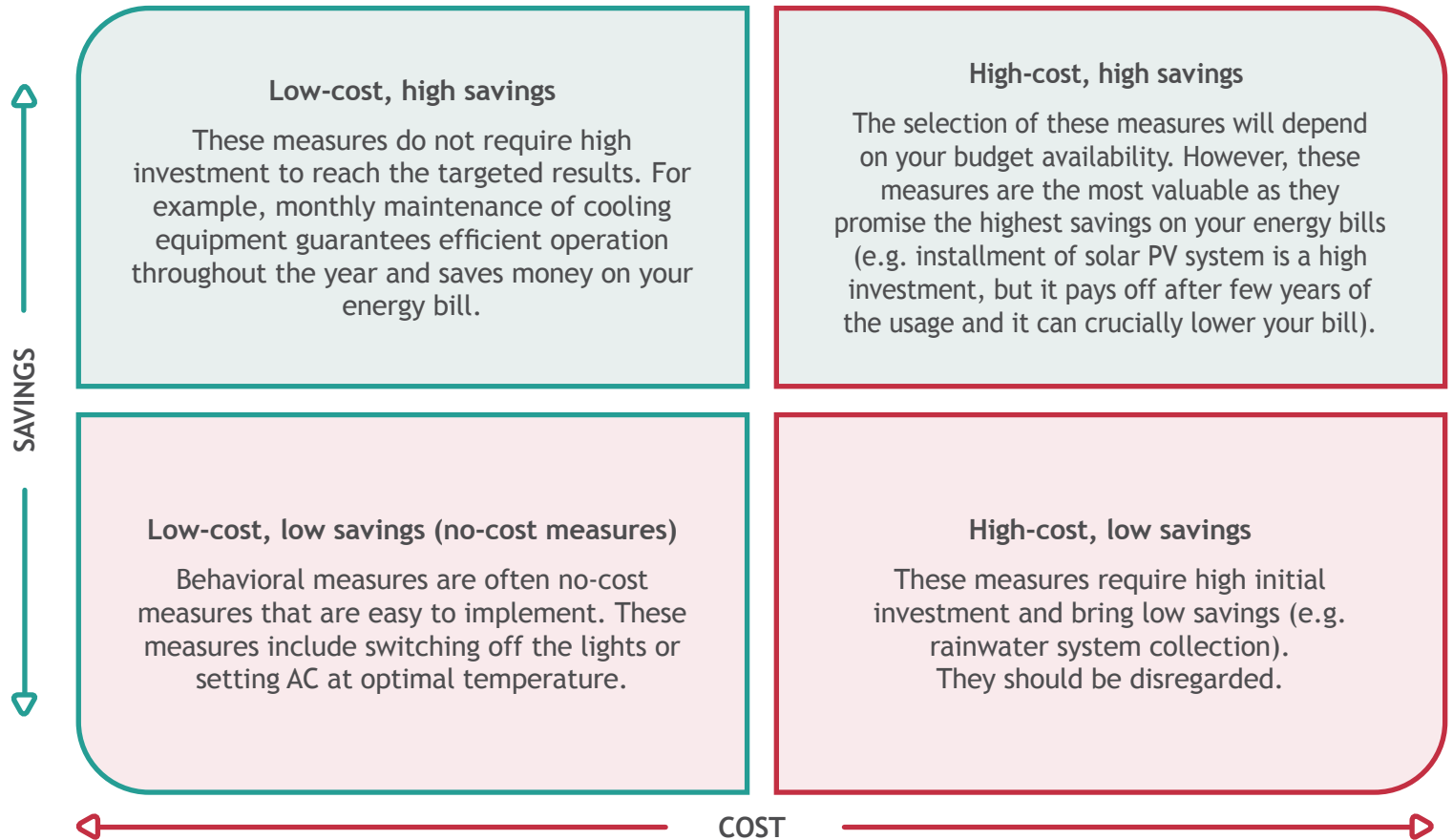
The main outcome of the energy audit are Energy Conservation Measures (ECMs) which define the actions that need to be taken to achieve higher energy performance.

Always make sure the outcome of your audit includes:

- ▷ Description of existing situation
- ▷ Description of proposed change
- ▷ Potential energy savings
- ▷ Possible impact on occupant health, comfort and safety
- ▷ Possible impact on O&M
- ▷ Associated cost
- ▷ Expected life of new equipment
- ▷ Outline of personnel training required
- ▷ All calculation performed
- ▷ Any non-energy benefits



ECMs should be categorized based on estimated costs and potential savings



Once the categorization is done, based on the budget available for energy management and your energy policy targets, choose the measures that you want to implement and discard the others with an explanation.

Quick example:

End use or Process	Number of items	Current situation	Proposed energy conservation or O&M measure	Potential impact on O&M	ECM cost (AED)	ECM potential savings (kWh/y; IG/y)	Prioritization cost/saving
AC Unit - Window							
Lighting - Incandescent							
Lighting - LED							
Process equipment							
Process -Chipper mill							
Other							

Once the list of prioritized ECMs is developed, next focus is on **building a proper Energy Management Plan**.

- ▷ The plan should include a **business case** for each ECM (briefly described in the Before You Start section, page 10) and a framework in which it will be implemented.
- ▷ A key consideration to ensure successful implementation is the **lead time required for the implementation**.
- ▷ Where possible, try to **align** the timing of the development of your plan **with your regular business cycle** (i.e. ensure sign-off from decision makers is obtained before budgeting is finalized for the following fiscal year).

The **business case** for low or no-cost ECMs is usually **straightforward** because these measures simply involve changing existing processes and procedures. When savings are achieved with no or little investments, these ECMs are usually very compelling.

On the other hand, the **business case** for high cost ECMs needs to **highlight financial investments and expected returns** to resonate with decision makers. This can be done by using the **Simple Payback (SPB)** and/or **Life Cycle Cost (LCC)** methods:

- ▷ **Simple Payback** indicates how quickly the investment is paid back by energy cost savings. It is a useful tool for preliminary analysis to decide whether to continue with an ECM.
- ▷ **Life Cycle Cost** evaluates the cost of the equipment over its lifetime including the predicted operating and maintenance cost.

Once the ECMs are selected, **define your targets by summing the total energy savings from selected ECMs** and defining the percentage saved compared to your current energy use. Your target should be aligned with the target set in your Energy Policy.

Connect with Dubai Government
Super ESCO (Etihad Energy Services)
<http://www.etihadesco.ae>
or any other accredited ESCO.

List of accredited ESCOs or Energy
Auditors
on RSB website

<https://www.rsbudubai.gov.ae/escolist-of-accredited-escos/>

الاتحاد
Etihad
لخدمات الطاقة
Energy Services





Without your employees, suppliers and contractors, the Energy Management Plan cannot be implemented.

To effectively implement your energy management plan, you need to:



A.
ENGAGE
EMPLOYEES



B.
SELECT
SUPPLIERS





Engage Employees

All individuals in the organization have a role to play to achieve energy savings laid out in the energy management plan. The level of awareness and capabilities of employees are critical to the success of such an endeavor.



COMMUNICATE YOUR ENERGY MANAGEMENT PLAN

Effective communication is the primary method to ensure employee engagement. Engaging employees creates a common sense of purpose and encourages them to take more responsibility, which leads to long lasting results. In addition, employees working directly with specific operational areas can identify potential issues and opportunities in these areas.



Notes

People and their behaviors drive energy demand



Examples of effective communication channels and methods include:

- ▷ **Townhall meetings** - to brief all employees about the Energy Management Plan and implementation timeline, benefits, etc. and provide an open forum to ask questions and raise concerns
- ▷ **Corporate emails** - to formally inform employees about the Energy Management Plan
- ▷ **Orientation programs** - to provide basic information on organizational and individual energy use to new employees
- ▷ **Printed or digital materials** - develop attractive and informative posters in the office or break rooms explaining the change and impact of ECMs or discussing energy use in general
- ▷ **Events** - conduct an energy awareness month oriented towards employees with information about energy conservation savings and participating in local and international energy events e.g. Earth Hour, World Energy Day, World Water Day

Notes

المجلس الأعلى للطاقة
Supreme Council of Energy



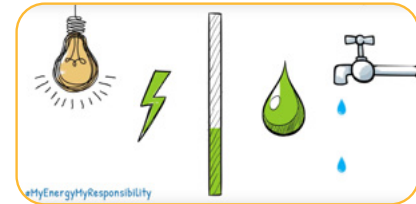
MY ENERGY MY RESPONSIBILITY
طاقتي مسؤوليتي



Dubai Supreme Council of Energy (DSCE) and TAQATI launched 'My Energy, My Responsibility' campaign in May 2018. The initiative is a joint government campaign between key government entities including ESMA, DEWA, Dubai Municipality, RTA, Etihad ESCO, RSB and others.

The government led campaign aims to encourage the Dubai community to be responsible for energy resources through cutting down usage, constant monitoring of consumption patterns and promoting energy efficiency behaviors.

As part of this campaign, a one stop shop website is made available to provide information and resources on energy efficiency, along with measures that can help them reduce their consumption (www.myenergymyresponsibility.ae). This information is also available on TAQATI's social media platforms.



MOTIVATE YOUR EMPLOYEES

Offering incentives is one of the most effective ways for organizations to create interest in initiatives and foster a sense of ownership amongst employees.

Examples of incentives for energy management include:

- ▷ **Internal competitions**
compare performance of similar facilities and foster a sense of competition
- ▷ **Financial bonuses and prizes**
offer cash bonuses or other rewards if the targets are met
- ▷ **Recognitions**
highlight and reward accomplishments of individuals, departments or facilities
- ▷ **Performance Appraisals**
tie employee performance appraisal to energy goals



TRAIN YOUR EMPLOYEES

Many organizations have found that informed and educated employees are more likely to contribute ideas, operate equipment properly, and follow procedures. **Investing in trainings, both technical and managerial, helps ensure the success of the Energy Management Plan.**

To build the right capabilities, improve understanding and adoption of new energy efficient technologies and foster a community of innovators and thought leaders in energy efficiency in Dubai, TAQATI developed the **Dubai Energy Efficiency Training Program** (a government initiative mandated by Dubai Supreme Council of Energy).

Trainings offered through this program cater to different target audiences, namely management, engineers, technicians and financiers to ensure the right capabilities to develop, implement and manage energy efficiency within organizations. For more information visit www.taqati.ae/trainings.





Select Suppliers

It is recommended to invest some time to develop detailed specifications in line with your organization's procurement policy.

If you have not already done so at earlier stages in the process, this may be a good time to engage an energy services company (ESCO) to help you in choosing and engaging the most technically and financially adequate suppliers.

When comparing different suppliers, it is important to look beyond the price and incorporate other evaluation criteria into your decision making process:

- ▷ **Energy Performance:** How much energy does the equipment consume? Does it provide the output required? Is it sized appropriately?
- ▷ **Warranties:** What level of warranty does the supplier offer and for how long? Is the equipment performance and efficiency covered?
- ▷ **Maintenance Requirements:** How often does the equipment need to be maintained? Can it be done in-house or does requires external support?
- ▷ **Lead Time:** When would the supplier be able to deliver and install the equipment?



Tips

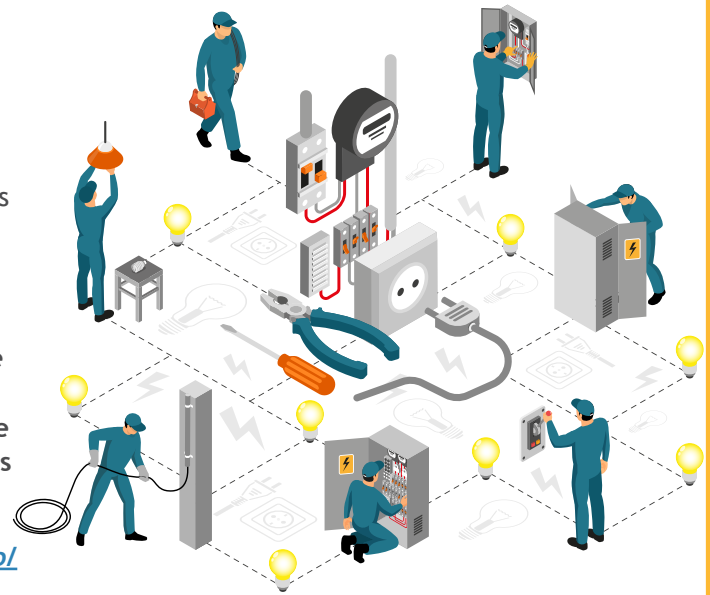
Going the extra mile

Green procurement practices enable procurement at competitive prices with reduced environmental impact: lower carbon emissions due to lower consumption of electricity, lower waste generation and lower toxic emissions.

In line with the Demand Side Management strategy, The Dubai Supreme Council of Energy launched the **Green Public Procurement for Energy and Water Efficiency (GPPEWE)** initiative for the implementation of green procurement practices across Dubai Government.

Green Public Procurement for Energy and Water Efficiency (GPPEWE) guidelines and criteria can be applied to all organizations. The primary focus of the guidelines is to reduce direct electricity and water consumption and reduce indirect consumption and emissions (upstream and downstream) of the product or service purchased, in line with the Greenhouse Gas Protocol (GHGP).

<http://taqati.ae/green-public-procurement-roll-out-workshop/>



3



CHECK

Once the ECMs defined in the Energy Management Plan have been implemented, the next step is **measuring and monitoring the achieved energy savings**. This enables your organization to evaluate the actual energy performance against the energy management targets and objectives.

Measure the actual results and compare to your planned savings



MEASURE AND MONITOR

REPORT

A

CALCULATE ACTUAL
ENERGY SAVINGS

B

EVALUATE THE ENERGY
MANAGEMENT PLAN

C

DEVELOP ENERGY
MANAGEMENT REPORT



Calculate actual energy savings

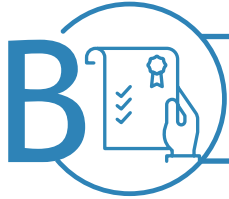
Energy savings cannot be directly measured, because savings represent the absence of energy consumption or demand. These savings are determined by comparing measured consumption before and after implementation of ECMs, adjusting for changes in conditions. The comparison of before and after energy consumption or demand should be done on a consistent basis, using the following general equation:



Notes

The International Performance Measurement and Verification Protocol (IPMVP®) is an internationally adopted framework that describes fundamental principles that define standard terms and suggests best practice for quantifying the results of energy management investments and increase investment in energy and water efficiency, demand management and renewable energy projects.

$$\text{Achieved Energy Savings} = (\text{Baseline Consumption} - \text{Current Consumption}) \pm \text{Adjustments}$$



Evaluate the Energy Management Plan

The review of the plan should result in improvement recommendations:

- ▶ Consider areas of significant energy use and relevant factors influencing these areas
- ▶ Define measurement requirements and review them regularly
- ▶ Compare and assess the expected vs. actual energy consumption over fixed time periods
- ▶ Document the results of energy performance monitoring and any significant deviations in energy performance
- ▶ Collect feedback from the energy management team, implementation staff and others

- ▶ Take stock of behavioral changes implemented by employees
- ▶ Quantify all benefits from Energy Management Plan (e.g. employee productivity, comfort, impact on sales, reduces O&M expenses, improved PR)





Develop the Energy Management report

- ▶ The report should include the lessons learned and recommendations for improvement. The report should be presented to the management for review. *(Check the example of the report below.)*

Report Example:

Energy Management Report - Year X	
Short Organization Profile (incl. processes & equipment)	
Energy savings targets for Year X	
Achieved energy savings in Year X	
Planned energy conservation measures	
Implemented energy conservation measures	
Behavioral measures implemented	
Main factors contributing to the results	
Summary of the Energy Management Plan	
Required corrective measures	
Energy Policy update requirements	
Other lessons learned	
Next steps	



Tips

- ▶ If you are a government organization, report your savings to Dubai Supreme Council of Energy and be recognized as a leader in Energy Efficiency
- ▶ It is also important to recognize and communicate the achievements of the Energy Management Plan and employee contributions

APPLY FOR AWARDS



GOVERNMENT:

Emirates Energy Awards
by Dubai Supreme Council of Energy
<http://www.emiratesenergyaward.com>



EDUCATION:

School Conservation Award
by Dubai Electricity and Water Authority
<https://www.dewa.gov.ae/en/about-us/sustainability/conservation-award>



INDUSTRY:

Dubai Green Industrial Awards
by Dubai Exports
<http://www.dedc.gov.ae/English/Initiatives/Pages/Dubai-Green-Industrial-Award.aspx>



HOTELS:

Dubai Sustainable Tourism Awards
by Dubai Department of Tourism and Commerce Marketing (DTCM)
<https://dst.dubaitourism.ae/Home/Awards>



A review of the Energy Management Report should be undertaken by top management to evaluate the suitability and effectiveness of the energy policy, the Energy Management Plan targets, indicators and measures, as well as the general state of your energy management system.

The management review is not only an assessment of the Energy Management status quo but also an important tool for the **identification of improvements to energy efficiency in your organization**. This review should be documented in the form of a protocol or action plan at least once a year.

The main outcome of this step is **identifying necessary corrective actions and improvements to the Energy Management Plan and Energy Policy**. Follow up measures and corrective actions should be integrated and implemented in the next energy management cycle.



Tips

Integrate energy management into your internal controls in order for top management to be kept informed about the status of the energy indicators.

ANNEXES AND SOURCES

ANNEX - LIST OF POTENTIAL ENERGY CONSERVATION MEASURES (ECMs)



BUILDING ENVELOPE

- ▷ Improve the insulation of walls, floors, ceilings and roof
- ▷ Upgrade windows including replacing single pane glass with insulating glass, shading, films, screens, etc.
- ▷ Seal exterior cracks, openings and gaps
- ▷ Air seal with weather stripping on doors or sealing and caulking on windows to minimize air infiltration
- ▷ Use green roofs where possible

ANNEX - LIST OF POTENTIAL ENERGY CONSERVATION MEASURES (ECMs)



HVAC

- ▷ Properly size your cooling requirements and avoid oversizing
- ▷ Replace old AC units and chillers with new high efficiency models (4 or 5 stars based on ESMA rating)
- ▷ Use water-cooled instead of air-cooled condensers
- ▷ If possible, retrofit your facility to connect with District Cooling network. District cooling is ~ 40% more energy efficient than other cooling solutions
- ▷ Set your AC thermostat to 24 degree Celsius, or higher and allow temperatures to rise in unoccupied rooms or during unoccupied periods
- ▷ Optimize AC system operating hours (i.e. evenings, weekends, holidays)
- ▷ Install building automation systems or energy management systems
- ▷ Check AC filters on a regular basis and clean/change them as needed to ensure optimal system performance

ANNEX - LIST OF POTENTIAL ENERGY CONSERVATION MEASURES (ECMs)



LIGHTING

- ▷ Replace old lighting fixtures with new efficient LED lights, which are up to 85% more efficient than incandescent or halogen lights and up to 50% more efficient than CFL lights
- ▷ Replace old “exit” signs with new LED models
- ▷ Install smart lighting controls such as timers and control systems, dimmers, occupancy and motion sensors
- ▷ Install solar lights for your outdoor spaces
- ▷ Consider using daylighting, sky lighting and task lighting
- ▷ Do not over illuminate- Make use of natural daylight and avoid turning on lights during the day
- ▷ Always keep your light fixtures and lamps clean

ANNEX - LIST OF POTENTIAL ENERGY CONSERVATION MEASURES (ECMs)



APPLIANCES

- ▷ Replace old appliances with new energy efficient ones (4 or 5-star ESMA rating)
- ▷ Perform regular maintenance on your appliances to optimize performance (e.g. dirty cooling coils in refrigerators, defrosting freezers)
- ▷ Operate washing machines and dishwashers at full capacity
- ▷ Switch off water heaters during summer and water coolers during winters
- ▷ Check control valves for leaks

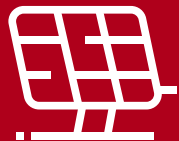
ANNEX - LIST OF POTENTIAL ENERGY CONSERVATION MEASURES (ECMs)



WATER USE

- ▷ Regularly inspect your facilities for water leaks, dripping faucets and sinks and fix them promptly
- ▷ Clean water tanks at least once a year. Water tanks naturally build up sediment, which reduces efficiency
- ▷ Install efficient water fixtures:
 - ▷ Water flow for faucets should not be higher than 6 l/min
 - ▷ Water flow for shower heads should not be higher than 8 l/min
- ▷ Install water flow restrictors such as aerators and motion sensors
- ▷ Inspect and repair pipe insulation
- ▷ Install efficient irrigation systems that are adapted to your landscaping needs and add smart timer controls to achieve higher water efficiency
- ▷ Use recycled water for irrigation if possible

ANNEX - LIST OF POTENTIAL ENERGY CONSERVATION MEASURES (ECMs)



SOLAR ENERGY

Install solar panels on your roof and/or outdoor parking areas. Solar power is a clean alternative source of energy that allows you to generate energy on-site, save money on your energy bill, and protect the environment.

SOURCES

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