

# ENERGY EFFICIENCY FLAGSHIP PROJECT

ABU DHABI SUSTAINABILITY GROUP REPORT





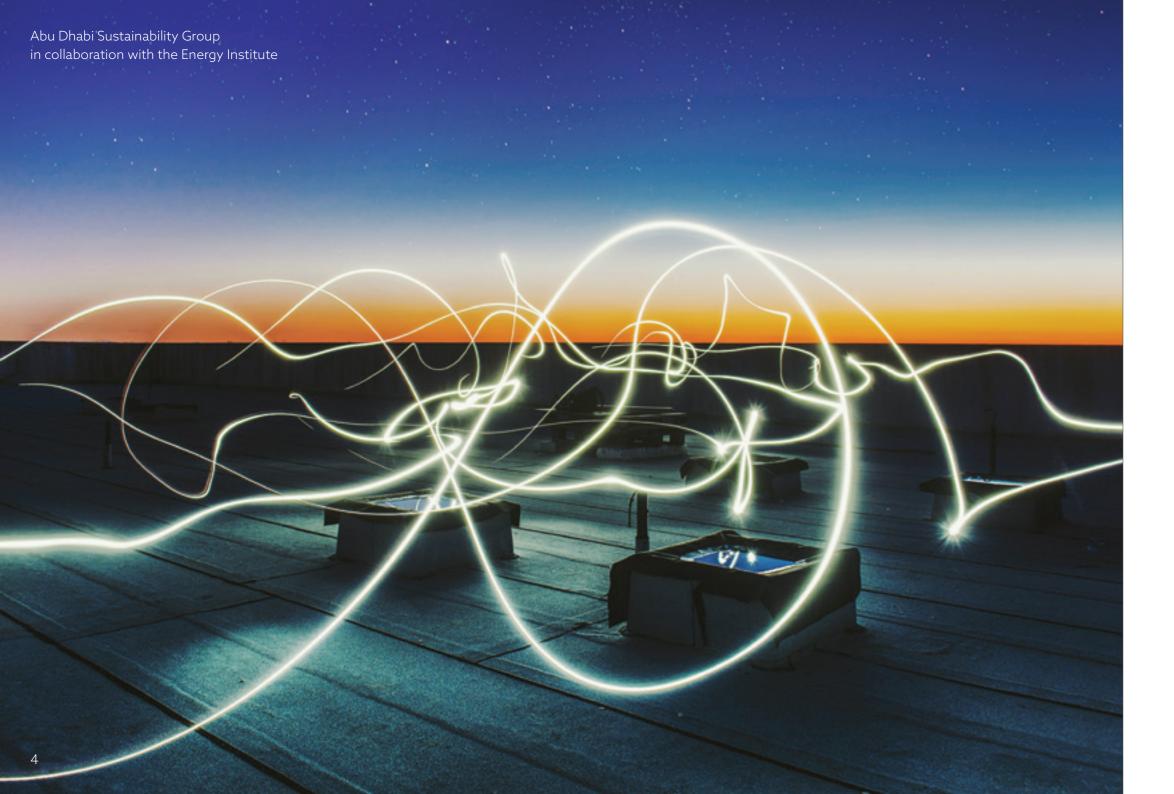




## CONTENTS

Foreword by Environment Agency - Abu Dhabi
Foreword by Energy Institute
Introduction: Energy Efficiency Flagship Project The building: Al Mamoura Building Block A
Sharing knowledge: Hiwar
Developing Skills: Training  Energy Champions Fundamentals training programme 3-day Classroom Training Integrated online Training Refresher Workshop Energy Audit Projects
Raising awareness: EnergyAware UAE
Awards
Energy Champions meetings & future/next steps





#### ABOUT ENVIRONMENT AGENCY – ABU DHABI (EAD)

Established in 1996, the Environment Agency – Abu Dhabi (EAD) is committed to protecting and enhancing air quality, groundwater as well as the biodiversity of our desert and marine ecosystem. By partnering with other government entities, the private sector, NGOs and global environmental agencies, we embrace international best practice, innovation and hard work to institute effective policy measures. We seek to raise environmental awareness, facilitate sustainable development and ensure environmental issues remain one of the top priorities of our national agenda.

#### ABOUT THE ABU DHABI SUSTAINABILITY GROUP (ADSG)

The Abu Dhabi Sustainability Group (ADSG) is a membership organisation whose mission is to promote sustainability management in Abu Dhabi by providing learning and knowledge sharing opportunities for government, private companies and not for profit organisations in a spirit of cooperation and open dialogue. The ADSG was set up by EAD in 2008, with the support of the Executive Council of Abu Dhabi, as a forum of members who have signed the ADSG Declaration, committing to adopt best practices of sustainability management and reporting and to actively participate in ADSG activities. The ADSG is open to new members willing to practice and champion sustainability in Abu Dhabi in a spirit of cooperation and open dialogue **www.adsg.ae.** 

#### ABOUT THE ENERGY INSTITUTE (EI)

The Energy Institute (EI) is the chartered professional membership body bringing global energy expertise together. We gather and share essential knowledge about energy, the skills that are helping us use it more wisely, and the good practice that keeps it safe and secure. We articulate the voice of energy experts, taking the know-how of around 20,000 members and 250 companies from 120 countries to the heart of the public debate. And we're an independent, not-for-profit, safe space for evidence-based collaboration, an honest broker between industry, academia and policy makers.

## FOREWORD BY ENVIRONMENT AGENCY - ABU DHABI

By 2040, the Middle East will see its energy demand rise 67 percent, according to latest estimates from the International Energy Agency. In the UAE, we fully understand the implications of this approximation, which we have set out to address in our ambitious national energy strategy. Corrective action, of course, starts at the most organic levels of our economy – across government departments, businesses and civil society.

To this end, the Environment Agency - Abu Dhabi (EAD) and Abu Dhabi Sustainability Group (ADSG), together with the Energy Institute embarked on shared mission to create the ADSG Energy Efficiency Flagship Project Report.

The new report is the culmination of a series of year-long efforts taken to raise the energy efficiency of the Al Mamoura Building Block A, which serves as the headquarters for large entities, including the Environment Agency - Abu Dhabi, Mubadala Investment Company and the Emirates Foundation.

Collectively, these organisations represent various aspects of the UAE's sustainability targets. By that yardstick, these offices also share a collective responsibility to ensure the energy efficiency of their operations.

Taking the first steps towards this goal, EAD, ADSG and the Energy Institute created the Energy Efficiency Flagship project that combined training, events, knowledge-sharing and awareness initiatives to nurture a culture of energy efficiency across the offices in the Al Mamoura Building Block A.

These initiatives have yielded outstanding results. Our first and most notable achievement is the creation of an energy efficiency working group that includes energy champions from each of the entities in the building, led by a representative from FAD.

Secondly, these energy champions have been equipped with practical training by the Energy Institute, to enable them to bring long-term value to their organisation's energy saving efforts. To develop these skills, the 14 - member working group underwent intensive training consisting of a three-day classroom session enhanced by integrated online learning elements, attended a one-day awareness workshop and worked on energy audit projects to apply their learnings.

The outcomes of the energy audit, focused on EAD's office premises, have been substantial. Overall, the EAD staff observed that the energy management practices were reasonable in several areas, and the promotion and investment towards energy

efficiency were good. Yet, it was found that while records of various sustainability efforts were maintained, no targeted action was taken on the back of such data. Accordingly, a monitoring and targeting approach has been recommended to create a real measure of progress.

Other recommendations include the installation of electricity sub-meters at strategic locations, following an energy efficiency-driven procurement policy, increasing the use of solar power and so on.

This capacity to review and take energy saving action now exists in all the entities at the Al Mamoura Building Block A. While it is still too soon to see significant energy savings just yet, this project offers a vital inroad for EAD, ADSG and other organisations in the UAE to develop a tailored approach towards their internal energy management processes, strategies and implementation. Needless to say, in the long run, these initiatives will play a critical role in achieving the energy vision of our nation.

Her Excellency Dr. Shaikha Al Dhaheri, Acting Secretary General, Environment Agency - Abu Dhabi





## FOREWORD BY ENERGY INSTITUTE

Energy is crucial to our economic prosperity and social wellbeing. It defines modern life. It lights, heats and cools our businesses and homes, it gets us from A to B. It's the bedrock of economic and social development, supporting jobs, food production, construction and clean water.

At its heart, energy is all about people. The billions who use energy to go about their daily lives, and the innovators, engineers, scientists and entrepreneurs who make it all possible.

And it is these people who will be tasked with meeting one of the most pressing challenges facing humanity: decarbonising the global energy system at the same time as opening up access to energy for the world's growing population.

Energy efficiency has a vital role to play at the heart of this challenge. The International Energy Agency (IEA) estimates that 40% of the emissions abatement required by the Paris Agreement could be provided by energy efficiency. The UAE has itself, through its Energy Strategy 2050, set an aim of increasing consumption efficiency among corporations and individuals by 40%.

The most effective, enduring outcomes happen when implemented by skilled professionals. And that's what the Energy Institute (EI) is here for: equipping organisations around the world with the training, knowledge sharing events, professional recognition, engagement tools and online resources needed to manage energy better.

It is this aim that forms the basis of the Energy Institute's latest collaboration with the Environment Agency Abu Dhabi and the Abu Dhabi Sustainability Group.

This report marks the culmination of the Energy Efficiency Flagship programme, a pilot programme in which a series of activities were utilised to foster a collaborative approach to energy efficiency from residents of Al Mamoura Building Block A.

The project was achieved through a combination of training, knowledge exchange and awareness activities, delivered by the El's lead energy management trainer. The training was designed to provide participants with the skills required to become an Energy Champion, and to lead by example. The El has been heartened to see the successful results of these activities, and the ongoing work of the energy efficiency working group, which has been set up as a result of the programme.

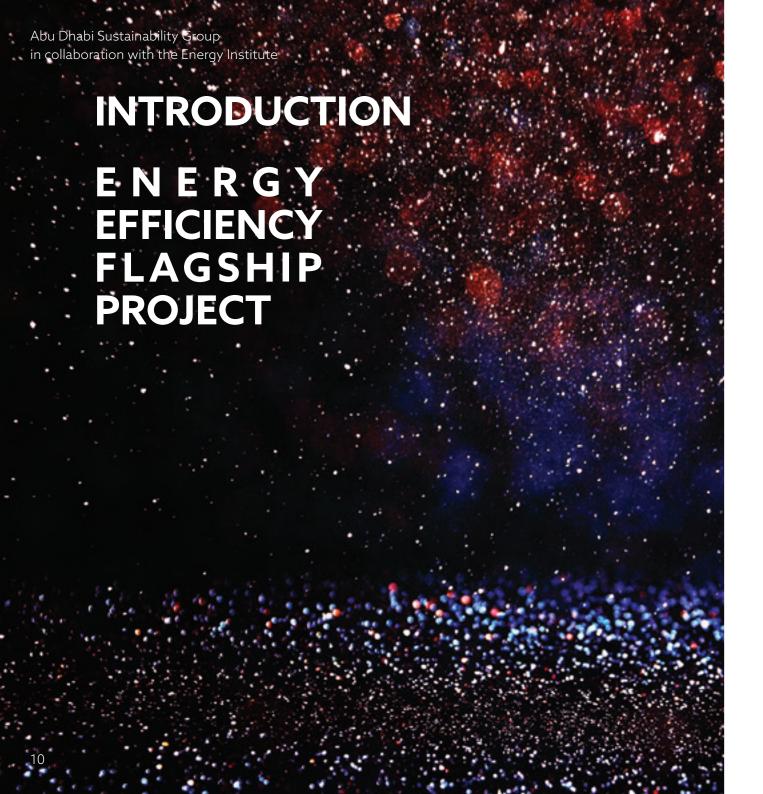
The El's Middle East branch is there to support anyone working within energy, and provides a great networking platform in the region, professional recognition opportunities, as well as bespoke training in areas like HSE, sustainability and energy efficiency. Our programme of events in the UAE is headlined by the annual HSE and Sustainability Forum, supported by ADSG. We also offer the gold-standard professional title for energy managers: Chartered Energy Manager.

Following the success of this pilot, the EI is offering similar programmes to organisations across the UAE, to help develop the skills, and share the knowledge and information, needed to see tangible results in the journey to energy efficiency.

Louise Kingham
Chief Executive, Energy Institute







The Energy Efficiency Flagship Project combined knowledge sharing, skills development and awareness raising activities within a UAE government office building to implement energy efficiency improvements, and used the outcomes to demonstrate the value of energy efficiency.

This report outlines the various components of the Energy Efficiency Flagship Project and summarizes the key outcomes.

The project was delivered by the Energy Institute in collaboration with Environment Agency Abu Dhabi and the Abu Dhabi Sustainability Group. It focused on Al Mamoura Building Block A as a pilot to help showcase the value of educating, training and empowering staff members to champion energy management initiatives.

The project brought together representatives of entities based in Al Mamoura Building A to collaborate on effective energy management best practices.

### **KEY OBJECTIVES**





Form a Working Group of Energy Champions, representing various entities occupying the Al Mamoura Building Block A as well as the organisation responsible for managing the building



Provide energy management training to the members of the Working Group of Energy Champions



Raise awareness among Al Mamoura residents regarding energy management principles and efficiency



Showcase Al Mamoura residents' leadership role in sustainability and energy efficiency



Promote the Government Vision and exposure to all entities through the leadership of EAD and participation of leading organizations who are residents of Al Mamoura A



Provide an opportunity for ADSG members and other organisations more widely across the UAE to participate in a unique and specifically tailored programme that will help to inform and shape their internal energy management process, strategies and implementation

A blended learning approach combining both classroom and online training elements was used to allow the members of the Working Group of Energy Champions to maximise their knowledge and understanding of energy management.



In Al Mamoura the two largest occupiers are Mubadala Investment Company and The Environment Agency Abu Dhabi (EAD). The building has been developed and built by Aldar Properties PJSC.

#### **BUILDING OVERVIEW**

The property has 10 floors plus a mezzanine floor of office accommodation with an impressive full height atrium. On the ground floor there is a 150 seat auditorium which is available to occupiers and the public via prior arrangement with Al Mamoura Customer Service Representative. The management office and security centre can also be found on the ground floor. Externally, there is a multi-story parking facility which caters for 788 cars, visitor's car park with 88 spaces available and the roadside parking to the side of the building.

- Al Mamoura building is a dedicated state of the art office building with different companies occupying the individual floors, featuring the very latest in building technology, amenities and services for its business tenants.
- Al Mamoura occupies almost 52,000sq meters of international grade A office.
- Al Mamoura as an office complex, offers its tenants the best of everything from location to state of the art technology to on site share of amenities.
- Al Mamoura building produces some of its energy from the solar panels Installed by Masdar, A Mubadala Company that is laid on the rooftop of the car park.





The Al Mamoura Energy Efficiency Flagship Project was launched at ADSG's Hiwar which was held on the 27th of September 2017.

This Hiwar session is one of a series of events focused on economic, social and environmental issues and their implications for Abu Dhabi and the wider region, where speakers in this session outlined key developments and trends in effective energy management.

The Hiwar was delivered in collaboration between ADSG and the EI with the support of the Environment Agency – Abu Dhabi (EAD). Its aim was to raise awareness of the flagship programme, introduce key energy management concepts to ADSG members, and help identify important aspects of organisational culture.

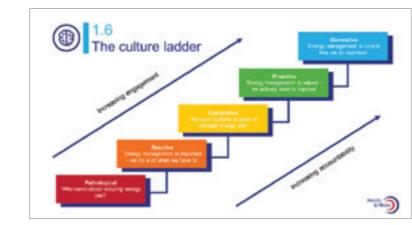
It brought together industrial psychologists with energy management specialists in order to help understand how to change energy efficiency behaviour. Four experts participated in this session, including Humaid Kanji, Environmental Economist, at EAD, Chris Burgess, Chartered Engineer and Lead Trainer at the Energy Institute and Tahir Hakim, a qualified Chartered Engineer, Chartered Environmentalist and Honorary Chairman for the Energy Institute Middle East. In addition to Will Sadler, Head of International Operations at Energy Institute facilitated the session as a moderator.

The El representatives utilised the El's Understanding Your Energy Culture tool to help achieve a holistic view of the audience's organisational approach to energy efficiency. The outcome was a very interactive and engaging discussion which gave a valuable insight into the approaches, barriers and drivers at their organisations.

One of the key themes to emerge was the challenges in achieving buy-in from senior leadership and realising long-lasting change. Methods for engaging senior leaders were discussed, as well as embedding energy management into corporate strategy and processes.

A number of attendees determined to take actions as an outcome of the Hiwar, including developing an energy policy, introducing energy into procurement/ supply chain criteria for contractors and defining energy efficiency as a key corporate value.









ENERGY MANAGEMENT PROCESS





B DAY CLASSROOM COURSE



**TRAINING** 















STAFF MEMBERS





**ENERGY SOLUTIONS** 



#### WORKING GROUP

Following the Hiwar, the Working Group of Energy Champions was formed by 14 staff members from selected organisations occupying the Al Mamoura Building including the Environment Agency - Abu Dhabi, Mubadala Investment Company, Emirates Foundation, Omeir and Aldar Properties in coordination with JBI-Serco. Members included professionals with different backgrounds ranging from facilities managers, occupational & public health managers to sustainability and energy experts. They all committed to drive change within their organisation both individually and collectively as a group.











## ENERGY CHAMPIONS FUNDAMENTALS TRAINING PROGRAMME

The training programme was designed to provide a basic understanding of energy management with a focus on the practical skills required for conducting a simple energy audit and identifying energy efficiency improvements including behavioural change activities.

#### Key training elements included the following:

- A 3-day classroom course.
- An 8-hour online course.
- · A follow-up 1-day refresher workshop.
- An integrated post-course energy audit project.
- · An online energy awareness tool.

The members of the Energy Champions Working Group were able to complete the online course at their own pace with the support of both their expert tutor and the El's training team.

#### 3-DAY CLASSROOM TRAINING

The classroom session of the Energy Efficiency Flagship Project was held from the 13th to the 15th of November 2017.

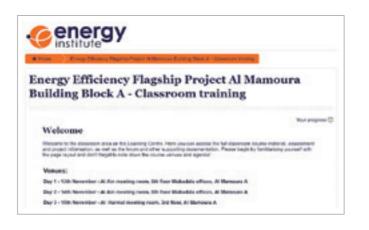
#### It covered essential energy management topics including the following:

- Energy Fundamentals.
- Energy Management Process.
- Monitoring & Targeting Techniques.
- Energy Solutions.
- Energy Efficiency Calculations.
- Practical Energy Auditing.

Delegates had the opportunity to learn how to identify typical energy saving opportunities commonly found in an office building. Key areas such as lighting, air-conditioning systems, motors & drives, pumps & fans, Building Management Systems (BMS), office electrical appliances were covered.

A variety of different course resources including presentation slides, calculation-based exercises, further reading documents, homework exercises were used.

All learning materials were available via the Energy Institute's Learning Centre.



### SITE TOUR

The third day of the classroom session included a tour to various facilities of the Al Mamoura Building allowing delegates to get a sense of the practical side of an energy audit.

The members of the Working Group were able to visit the building's air-handling unit plant room, BMS room, district cooling heat pump plant room and catering facilities. They received valuable insight from the expert trainer on how to maximise the energy performance and identify energy waste in each location.

#### **ASSESSMENT**

At the end of the classroom session, the members of the Working Group successfully completed a 60-minute online assessment consisting of a mixture of multiple-choice questions and short text-based answer questions.

 $The \ results \ were \ exceptional, with an average \ score \ of \ 88\%, \ demonstrating \ the \ Energy \ Champions' \ passion \ and \ commitment.$ 







### INTEGRATED ONLINE TRAINING

The learning experience was further enhanced with the provision of online training. The members of the Working Group completed at their own pace an 8-hour online training programme which was based on the following two modules of the Energy Institute's highly-acclaimed 'Level 1: Certificate in Energy Management Essentials' training course:

- · Introduction to energy management.
- · Mounting an effective energy awareness campaign.

#### Key learning objectives included:

- · Describe the role of an energy champion and energy manager.
- Explain the significance of energy management and energy auditing.
- Determine whether or not your organisation is carrying out a systematic approach to energy management.
- · Plan an effective staff awareness campaign so that you can realistically achieve your goals.
- · Assign roles and responsibilities when implementing a campaign.
- Describe how to confirm the effectiveness of the campaign by reviewing the levels of awareness throughout the organisation.
- Explain the importance of gaining and maintaining the right level of commitment throughout the different levels of management.

Through a mix of text-based resources, practical activities and various checklists and tools, the members of the Working Group were able to familiarise themselves with the key concepts of each module. At the heart of the online training session were the concepts of staff motivation and staff engagement in order to drive change and reduce energy waste.



### REFRESHER WORKSHOP

Following the completion of the classroom and online training elements of the project, the El's Lead Energy Management Trainer and Advisor delivered a full-day refresher training workshop on the 22nd of February 2018, day 2 of the Abu Dhabi prestigious Sustainable Business Leadership Forum.

The workshop covered the key lessons learned during the course and allowed the members of the Working Group to have discussions with the trainer on the progress of their energy audit reports and also on how to work as a group moving forwards and establish and maintain the momentum required to drive change.

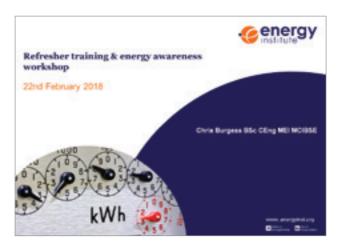
During the workshop, further training was provided on how to complete a staff awareness campaign using EnergyAware, the Energy Institute's 30-minute online tool designed to support engagement with energy efficiency for any staff within an organisation.

### **FEEDBACK QUOTES**

- The classroom session was nicely structured in a way that it is suitable to the people who are already on the maintenance field as well as people in management positions.
- The course has covered almost all the aspects of efficient usage of energy.

It was a good mix of technical understanding, useful guidance and implementation tools.

Excellent course structure, we learned a lot.







### **ENERGY AUDIT PROJECTS**

A key element of the training programme was the completion of post-course project. The objective was to allow Energy Champions to gain experience of carrying out a simple energy audit, making recommendations and writing an audit report.

The Energy Champions were split into groups based on their organisation and worked together to prepare their report.

Each group covered the part of the Al Mamoura Building occupied by their organisation.

#### **ENERGY AUDIT SCOPE**

Members of the Energy Working Group agreed which of the entities occupying Mamoura Building A would be the most appropriate for on-site energy audits which were conducted in accordance with the guidance provided as part of the training programme, and with support from an expert tutor.

#### The agreed objectives for the energy audits were to:

- Identify areas for energy efficiency improvement and opportunities for reducing energy consumption and cost
- Provide an audit of energy consumption and cost based on the previous 12 months' invoiced accounts
- Highlight key sources of energy consumption with recommended improvements.



### BUILDING CHARACTERISTICS

Al Mamoura Building A is an eleven-storey office building with a multi-storey car park and has a total floor area of almost 52,000 m2. It is occupied by several government entities and facilities are managed by the building management company (JBI-Serco).

The electricity consumption during 2017 amounted to some 6,899,400kWh and was supplied by Abu Dhabi Electricity and Water Authority. Chilled water for building cooling is imported from the Tabreed district cooling system with a consumption of around 3,759,200Tonhours over the same period.

In Building A, there are four Abu Dhabi Distribution Company electricity meters serving different areas of the building and an electricity sub-meter installed on each floor. However, the sub-meters do not record electricity used in common areas such as elevators and server rooms. In addition there is a lost opportunity in that the electricity sub-meter readings are not recorded and used for energy management purposes.

To produce electricity invoices for each entity the Building Management Company allocates electricity consumption and cost to each entity pro-rated in proportion to their occupied floor area to total floor area of the building. It is recognised by entities that this is a limiting factor in respect of the effective management of energy.

Abu Dhabi Sustainability Group in collaboration with the Energy Institute

#### Energy Efficiency Flagship Project Report

## SUSTAINABILITY AND ENERGY POLICY

The Building Management Company (JBI-Serco) has an adopted Sustainability and Energy Efficiency Policy aimed at ensuring efficient management of resources and including procedures for continual improvement.

#### The policy objectives are to:

- Reduce energy costs and consumption.
- Improve environmental monitoring.
- Prevent pollution.
- Increase energy efficiency.
- Conserve water.
- Reduce consumption and waste.
- Reuse, recycle and purchase recycled content products.
- · Reduce reliance on non-renewable resources.

## SUMMARY OF ENERGY AUDIT RECOMMENDATIONS

The Environment Agency Abu Dhabi (EAD) is one of the larger entities occupying Al Mamoura Building A and they also have a robust environmental sustainability and health and safety policy in respect of its numerous operations and facilities across the Emirate. The policy includes aspects of efficient resource management, pollution prevention, protection and conservation of environmental resources.

The audit covering the EAD office area and conducted by EAD staff included an analysis of the current energy management procedures using an analysis tool provided during the classroom course. The simple energy management matrix identifies the energy management strengths and weaknesses and areas for continued improvement.

The EAD analysis concluded that the energy management practices were reasonable in several areas whilst the promotion of energy efficiency and sustainability was rated as good and investment in energy efficiency measures rated at the highest level.

Managing energy consumption is part of the EAD 5-year strategic plan. Corporate sustainability is a strategic priority to EAD and performance results and KPIs are regularly reported and presented to management. KPIs captured include electricity, cooling, water, waste, paper, fuel and GHG emissions. Actions are identified and implemented in certain areas. Examples include the installation of LED lights to reduce electricity consumption and introduction of automation features for processing paper waste. It is recommended that a simple monitoring and targeting approach is adopted to track progress towards the reduction targets required to meet the strategic objectives.

At the time of the audit, work was underway to optimise the performance of the VAV air conditioning system to reduce both chilled water and electricity consumption. This involved rebalancing the air distribution by upgrading VAV terminals and repairing faulty or poorly maintained equipment. The report recommended that an improved preventive maintenance program should be implemented.

#### The report made further recommendations including:

- The installation of desiccant de-humidification to control internal humidity and reduce air conditioning energy demand should be evaluated.
- Using electricity sub-meters at strategic locations to record actual electricity consumption rather than by calculation based on percentage of total area occupied. Sub-metering could be extended to monitor different services such as lighting, kitchens and business machines to aid management of electricity consumption.
- Evaluating the potential and practicability to implement automatic shut-down of office equipment.
- Implementing a procurement policy whereby the energy efficiency of office and other equipment would be considered within the purchasing decision.
- Avoiding energy wastage by motivating staff to keep doors and windows closed when air conditioning or heating is operational.
- · Increasing the use of renewable energy such as solar energy.
- To consider implementing the current proposal to acquire electric vehicles and to monitor their effectiveness in reducing greenhouse gas emissions.

29

Abu Dhabi Sustainability Group in collaboration with the Energy Institute

On the floors occupied by Mubadala the key recommendations were based around installing light occupancy sensors and upgrading existing fluorescent lighting and halogen spot lamps to low energy solid state (LED) lamps.

The Building Management Company (JBI-Serco) produced an energy audit report based around its existing sustainability action plan which included 76 detailed recommendations. These covered hardware projects for example LED lighting upgrades through to policy initiatives such as improved water management, developing an environmental management establishing guiding principles for employee energy conservation and guidelines on maintenance requirements for energy efficient building operation.



## RAISING AWARENESS ENERGYAWARE UAE

Following on from the refresher workshop delivered during the Sustainability Leadership Forum in February 2018, the El designed an online tool specifically to support energy awareness among workforces across the UAE.

EnergyAware is the Energy Institute's practical interactive online software designed to help staff understand how to better manage their energy usage, thereby cutting organisational costs and reducing carbon emissions.

In creating a version fit for a UAE audience, the EI incorporated various technical content updates and new graphic elements to suit the needs of staff members based in UAE. The UAE version includes sustainability messaging in line with the UAE 2030 vision, as well as incorporating UAE energy tariffs and showing estimated energy savings in Dirhams.



Abu Dhabi Sustainability Group in collaboration with the Energy Institute

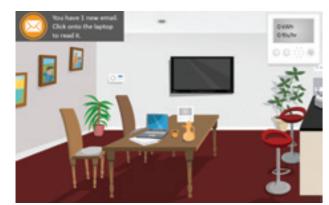
#### On completion of EnergyAware users will:

- Be able to state ways in which energy bills can be reduced at home.
- Be able to identify how savings at home can be applied to the workplace.
- Have compiled a checklist of ways in which energy consumption and costs could be reduced in their workplace.

As users go through the online tool, they are able to explore typical working environments - including an office, a warehouse and a factory - and identify common energy saving opportunities. They also explore a home environment, which allows them to understand the personal benefits that can come from using energy efficiently.

#### AT HOME









As users explore the various environments, they are able to identify and select typical energy consuming appliances and equipment, and receive useful tips and information on how to save energy.

Moving forwards, Energy Champions are encouraged to conduct their own staff awareness campaigns within their entities through rolling out the tailored version of EnergyAware to their colleagues.



#### **AWARDS**

ADSG and the EI have also collaborated to initiate the Best Energy Management Initiative Award, as part of ADSG's Sustainable Business Leadership Awards.

The Awards, launched for the first time in 2015, are a scheme designed to celebrate sustainability best practice and to raise awareness about the benefits of sustainable management practices for organisations. As part of the mission of the ADSG, these Awards are another manifestation of the Working Group's commitment to knowledge sharing aimed at improving sustainability performance. They have become renowned as a platform for recognition of outstanding achievement in sustainability, setting apart those who have shown passion, innovation and best practice in tackling the sustainability challenges we face.

As the independent chartered professional body for energy, the Energy Institute were ideally placed to judge the Best Energy Management Initiative Award, which is designed to recognise excellence in energy management and was launched in 2018. The inaugural award was won by Dubai Supreme Council of Energy. Their winning entry, the Dubai Integrated Energy Strategy 2030, demonstrated a clear vision and approach to tackling energy efficiency in the city in the coming decades.



## ENERGY CHAMPIONS MEETINGS

Following completion of the Energy Efficiency Flagship Project, the members of the Working Group have set up a series of meetings to discuss and explore ways of building and maintaining the necessary momentum for improving the energy performance and energy culture of their respective entities.

These meetings are envisaged to act as a platform for the Energy Champions to be able to share with each other their achievements and also their views around the challenges arising from sharing a building with common areas and shared consumption and bills, and allocating time and resources into reviewing the possible modifications within the building.

Acting on the findings of the energy audit reports, positive steps have already been made including the installation of separate meters in one of the entities and also the initiation of awareness workshops in another entity.

The Energy Institute would like to welcome the Energy Champions' efforts to make the most of the knowledge and skills gained through this training programme and encourage the members of the Working Group to act as ambassadors of energy management and foster positive change within their organisations.





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