



الإتحاد العربي للأسمدة

Arab Int'l. Organization منظمة عربية دولية

Arab Fertilizer Association

Since 1975

ARAB FERTILIZER ASSOCIATION (AFA)
ENERGY SAVING WORKING GROUP (ESWG)

**ENERGY SAVING
CULTURE**



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MESSAGE FROM AFA BOARD OF DIRECTORS

The AFA Board is pleased to issue its ***“Energy Saving Culture Booklet”*** to all its members to share knowledge and experience and ensure that AFA members are continually striving towards energy saving whilst producing, transporting and applying fertilizer.

The AFA Board and General Secretariat would also like to convey its thanks and appreciation to the Energy Saving Working Group for its efforts in preparing and finalizing this valuable booklet.

Dr. Abdulrahman Jawahery

AFA Chairman

ARAB FERTILIZER ASSOCIATION (AFA)
ENERGY SAVING WORKING GROUP (ESWG)

ENERGY SAVING CULTURE



MESSAGE FROM AFA ENERGY SAVING WORKING GROUP

Welcome to this booklet on "***Energy Saving Culture Booklet***". This compilation highlights one of the most important and essential factors to improving fertilizer factory economies. We trust that by sharing these valuable practices and knowledge, AFA companies can attain further heights in energy saving care and productivity.

This document provides clear guidelines for establishing an Energy Saving Culture in partnership with the Arab Fertilizer Association members. Presented within this study is a systematic action plan and step-by-step tasks, each with distinct milestones and deliverables, which work towards the desired culture change. This strategy is intended to complement other energy saving initiatives and forms part of an integrated approach to energy management within the AFA member community.



**ARAB FERTILIZER ASSOCIATION (AFA)
ENERGY SAVING WORKING GROUP (ESWG)**

ENERGY SAVING CULTURE

Contents

Introduction	7
Establishing an Energy Saving Culture	8
The Culture Change Process	8
Action Plan for Establishing an Energy Saving Culture	9
Next Steps	15
Annex 1: Energy Awareness Questionnaire	16
Annex 2: Energy Management System Assessment Template	17
Successful Stories Arab Potash Company (Jump to Excellence Project)	22



Introduction

The Arab Fertilizer Association (AFA) is striving to further foster its role as a global player in the production of fertilizers and plant nutrients, thus supporting world food security through improved crop yields and soil nutrient enrichment.

AFA realizes that fertilizer production is an energy intensive business – Fertilizer production consumes 1.2% of the world's total energy while ammonia production consumes 94% of the industry's total energy. Therefore, energy saving is an essential factor for the increased economic success and stability of fertilizer companies.

Based on the above, AFA commissioned the Energy Saving Working Group (ESWG) to support its members in identifying and implementing energy saving initiatives.

The Mission of AFA's ESGW is to:

- Support AFA members and act as coordinator for them
- Promote technological advancements to reduce energy consumption
- Assist members in establishing energy management systems that seek continual environmental improvement
- Aid members in identifying technical solutions that aim to save energy while producing, transporting and applying fertilizers
- Help members establish energy benchmarks that promote efficiency and improvement
- Support members in developing and implementing innovative solutions in energy saving
- Contribute to forming energy management task forces in AFA member companies
- Make energy efficient improvements a matter of course in everything we do

ESWG have proposed key initiatives for energy management within its membership, including:

- Management system initiatives
- Technical initiatives for saving energy and protecting the environment
- Creative solutions
- Energy saving / management enablers, including, among other initiatives, the establishment of an energy saving culture within AFA member companies



Establishing an Energy Saving Culture

ESWG realises that most businesses could save 10% of their energy bills through zero or relatively low cost implications. Energy efficiency in the workplace cuts costs, improves competitiveness, and helps safeguard profits and employment. It also enhances an organisation's reputation by reducing carbon emissions, which helps to combat climate change.

Culture determines how people think and behave in any workplace, therefore establishing an energy saving culture is a necessary prerequisite to other energy saving initiatives.

The Culture Change Process

ESWG realizes that building an energy saving culture will be challenging as culture is formed over time and is often hard to define and understand. However, a strong energy saving culture is the crucial ingredient that our industry needs to achieve our energy saving goals.

A first step is to raise awareness amongst all staff on energy use and its implications. The proposed energy awareness and cultural change will complement other energy saving initiatives as part of an integrated approach to energy management within the members of AFA.

ESWG has developed a systematic action plan with step-by-step tasks, each with clear milestones and deliverables, to achieve the desired culture change. The action plan, presented here, relies on four essential steps to making energy awareness an integral part of our organisations:

1. Good planning – so we can realistically achieve our goals.
 2. Effective implementation – choosing the right time, and identifying clear and appropriate roles and responsibilities.
 3. Checking the effectiveness of the programme and reviewing awareness throughout our organisations.
 4. Maintaining the right level of commitment.
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Action Plan for Establishing an Energy Saving Culture

#	Action	Deliverable
1.0	MILESTONE 1: PLANNING	
1.1	Appoint a member of the management to champion the energy saving campaign and lead the culture change process.	Appointment letter
1.2	Set up an energy team which should include representatives from all parts of the organisation, especially key business areas such as production, maintenance, engineering, procurement, etc.	Energy team formation confirmation letter
1.3	Secure a budget for producing and distributing promotional materials as well as incentive schemes, such as competition prizes. (It is estimated that 1-2% of a total annual power bill is needed to create a successful energy saving campaign, which should lead to savings in the region of 5-10%).	Allocation of an energy saving campaign budget
1.4.0	Assess the current situation	
1.4.1	Know and understand company energy consumption, both in terms of cost and kWh. This will form part of the energy management programme, using the energy survey templates and KPIs published by the AFA Energy Saving Working Group (ESWG).	Collect and report data on the KPIs baseline KPIs published by ESWG
1.4.2	Research staff awareness levels regarding energy waste by collecting information on current attitudes through the use of questionnaires. (Questionnaires for key technologies, such as lighting, heating, refrigeration and compressed air, will be prepared and published on the AFA server).	Collect and report data on current attitudes and awareness See Annex 1 "Energy Awareness Questionnaire"
1.4.3	Monitor shifting attitude levels through repetition of staff surveys during and after the campaign	Collect and report data on staff attitudes and awareness levels during and after the campaign. Complete the questionnaire, Annex 1 again and compare with initial findings



#	Action	Deliverable
1.5	<p>Setting SMART goals</p> <p>SMART goals rely on being Specific, Measurable, Achievable, Realistic and Timebound. Use the information gained from assessment of the current situation to set goals. For example, 'Reduce the annual energy costs by 10% by quarter 4' or 'Reduce the annual electricity bill by 5% year on year.'</p>	Set a clear organisational direction by establishing solid goals, objectives, values and/or missions, published both internally and externally
1.6	<p>Messages and communication channels</p> <p>Messages and slogans should be punchy and diverse to interest a variety of people. Downloadable posters, booklets and stickers will be prepared and made available online at the ESWG SharePoint Server.</p> <p>Each AFA member should select the most appropriate delivery routes for the organisation. These may include emails, presentations, training, posters, staff newsletters, meetings, walk-arounds, stickers, notice boards, competitions, energy literature (leaflets, booklets or newsletters to illustrate how individuals can save energy), external input (invite experts to talk about energy saving) and environmental issues, etc.</p> <p>Possible campaign tools:</p> <ul style="list-style-type: none">• Emails: Email messages should be relevant and interesting.• Displays: Use part of existing notice boards or create a dedicated energy display as a focal point for communications. Use images such as photos, cartoons or energy-use charts.• Posters: Focus on a different issue for each poster. Use images. Replace them regularly to maintain interest. Place posters at the point of use and at eye-level.• Stickers: Like posters, stickers can be used to target different pieces of equipment or individuals. Use stickers at the point of use, on or near equipment, such as photocopiers, printers, computers, light switches and machines.	Determine the most effective material for the organisation and the most appropriate delivery routes



#	Action	Deliverable
	<ul style="list-style-type: none"> ● Promotional materials: Include messages on promotional materials, such as diaries, calendars, aid cards, leaflets, brochures and computer mouse pads. ● Word of mouth: Word of mouth is often the most powerful method of communication. Successful messages are those that provide information and get people talking about the issue. ● Staff newsletter/magazine: You could use a staff newsletter or magazine to publicize the energy awareness programme, to report on success stories, and if possible, include photos of the people involved. ● Incentives: Does the organisation have a system of staff bonuses? Could a percentage of the money you save by being more energy efficient contribute to these? It could appear on pay slips as an Energy Saving Bonus. ● Pay slips: People will see messages printed on pay slips when they look to find out what they have been paid. Each message can be appropriate to the month. ● Internal communications: Other systems for passing on information include headers and footers on internal paper communication, such as memos, minutes and staff appraisals. ● Suggestion schemes: These will generate energy saving ideas or related suggestions from staff. Provide a suggestion box or email address where people can make their suggestions and make sure this is accessible to everyone in the organisation. Ensure you respond promptly to suggestions (an Opportunity Log may be used to handle these ideas and a Recommendation Sheet (Action Plan) for each identified opportunity should be developed). ● Competitions, can you include department mini project competitions? Even HR can find ways of reducing its departmental impact, walk arounds, external publicity and support, energy literature, and others: All will serve to reinforce the organisational drive to alter employee awareness and attitudes towards energy saving, presenting the culture change as a positive and natural shift for the company and employees. 	



#	Action	Deliverable
2.0	MILESTONE 2 IMPLEMENTATION	
2.1	<p>Decide when to start the awareness programme and how long it should run.</p> <p>Carefully consider when the programme should begin. Avoid times when the organisation is particularly busy or when staff morale may be low. The longer the campaign runs, the more embedded the message will become in people's minds, however, also ensure the campaign does not become stale.</p>	Agree a start date and timeframe for the awareness campaign
2.2	<p>Assign roles and responsibilities.</p> <p>A project's successful achievement of its determined goals and objectives depends upon all involved having clearly defined roles and responsibilities. Draw from each team member's strength taking into account their role within the organisation. With a varied team and clear participation of all, the campaign will also be more likely to reach every part of the organisation.</p>	Roles and responsibilities on the awareness programme agreed and scheduled
2.3	<p>Gather and prepare promotional materials.</p> <p>Materials such as posters and stickers will be prepared and found on the ESWG SharePoint Server.</p>	Promotional materials delivered and/or produced
2.4	<p>Launch the programme.</p> <p>The programme should be run in isolation from any other planned initiatives and a time chosen when the maximum number of people are able to attend. Also, ensure that all know of the event and if possible, obtain external publicity for the event. Make sure a senior management representative attends the event or participates as their endorsement will ensure credibility and a high profile.</p> <p>Disseminate the materials and messages in phases – don't do everything at once.</p>	Senior management confirm attendance for the launch
3.0	MILESTONE 3 REVIEWING AND COMMUNICATING	
3.1	<p>Measure the success of the programme.</p> <p>Measure your organisation's progress towards set targets. Assessing the success of your campaign will show what is working and which areas need additional work.</p>	Report the comparison of energy consumption (KPIs) with the figures recorded at the start of the awareness campaign



#	Action	Deliverable
3.2	<p>Repeat the awareness questionnaire.</p> <p>Monitor whether attitudes have changed by conducting further staff awareness surveys.</p>	Collect and report data on attitudes and awareness after the campaign
3.3	<p>Report to staff and management.</p> <p>Progress reports can also be a powerful motivator. Think about what staff are interested in and report their successes accordingly. Create easy to understand diagrams and/or graphs to show progress.</p>	Report progress to staff and management
4.0	<p>MILESTONE 4 MAINTAINING AWARENESS</p>	
4.1	<p>Energy awareness should become as much a part of the culture of the organisation as safety, quality and customer care. In addition to awareness campaigns, it requires an attention to all the key elements of energy management. An energy policy is central to this and shows a visible and tangible commitment to energy efficiency and the environment.</p> <p>A formal written energy policy acts both as:</p> <ul style="list-style-type: none"> • A public expression of organisational commitment to energy conservation and environmental protection • A working document to guide the energy management practices and provides continuity. 	A formal written energy policy issued
4.2	<p>New employees</p> <p>Ensure that new employees are informed about energy issues. Dedicate a section of their induction training to energy awareness or create a section about it in any literature they receive upon joining the company.</p>	Create and dedicate a section of initial training for new employees to energy awareness



#	Action	Deliverable
4.3	<p>Maintaining momentum.</p> <p>To maintain interest:</p> <ul style="list-style-type: none">• Continue to communicate messages at longer intervals. Adjust these messages according to what is or is not working.• Where possible, build energy awareness into job descriptions and into individuals' objectives on good environmental practice.• Include energy efficient practices in workplace procedures.• Consider energy usage when purchasing new equipment and training people to use it.• Maintain displays and posters, and refresh them at regular intervals.• If competitions are successful, continue to run them at regular intervals and obtain sponsorship if possible.• Run an Energy Week each year. Use the opportunity to reaffirm the messages of the energy awareness programme. Vary the content and approach to keep interest levels high.	<ul style="list-style-type: none">• Production of new materials and timetable of dissemination• Additions to staff job descriptions and personal annual targets (where possible)• Review and inclusion of energy efficiency in published workplace procedures• Inclusion of energy efficiency in company purchasing procedures• An agreed plan regarding displays and poster maintenance with set time intervals



Next steps

Energy awareness is just one part of the equation. Take additional steps to make your organisation more energy efficient.

#	Action	Deliverable
1	<p>Energy Management System</p> <p>Management System energy in a structured way across all organisational functions is key to using energy efficiently and reducing costs. Amongst other aspects, energy management must include adequate data collection and analysis (metering, monitoring and targeting) to be effective.</p> <p>Encouraging Energy Management Accreditation: When the management system is sufficiently developed, consider suitable certification.</p>	<ul style="list-style-type: none"> Collect and report data on the energy management system, see Annex 2 “Energy Management System Assessment” Launch the Energy Management System Certification Programme
2	<p>Identify energy saving opportunities</p> <p>Participate in the exchange of information and experience accumulated by AFA member companies (energy saving initiatives sharing amongst all the members of AFA).</p> <p>Use walk around energy surveys to identify ways to reduce energy use through:</p> <ul style="list-style-type: none"> Behavioural and operational changes Improvements to plant and equipment 	Maintain an Opportunity Log and develop a Recommendation Sheet (Action Plan) for each identified opportunity
3	<p>Procurement and tax incentives</p> <p>When procuring equipment that uses energy, make sure that energy efficiency is taken into account.</p>	Amend procurement policies and procedures to take energy efficiency into account
4	<p>Review where you are</p> <p>It is important to regularly review your progress, make adjustments to your strategy and maintain momentum. Staff awareness in particular requires regular reinforcement and fresh ways for engaging people.</p>	Review and update Energy Management System policy and targets regularly at company Management Review Meetings (MRM)



Annex 1: ENERGY AWARENESS QUESTIONNAIRE

ATTITUDE	Current	Mid	Post
	%	%	%
What is the general attitude of people towards energy saving?			
Very positive; staff actively save energy and believe they can make a difference			
Aware and positive, but it's not part of the daily work culture			
Quite energy aware and occasionally pass on information			
Neutral but no commitment: some staff occasionally try to save energy			
Generally negative and apathetic towards energy saving			
ENVIRONMENTAL IMPACT			
To what extent are people aware of the environmental impact of energy use?			
Very aware and informed			
Most are aware of environmental impacts			
Aware of some of the issues			
Aware, but not convinced or have not yet made the connection			
Hardly anybody is aware of the environmental impact			
COST AND WASTE			
What is the level of awareness of energy costs and where energy is wasted?			
People are completely aware of costs and where energy is wasted			
Most are aware of costs and of where energy is wasted			
Some are aware of energy costs and where it is wasted			
Few are aware of energy costs and where it is wasted			
People are not aware of energy costs nor where it is wasted			
ENERGY SAVING			
To what extent are staff aware of the ways in which they can save energy?			
People are well informed and conversant on how to save energy			
People are aware of more than basic measures of saving energy			
People are aware of basic energy saving measures, i.e. turning off lights, turning down heating etc.			
People are not aware of energy saving measures.			
MOTIVATION			
What is the general motivation of people towards energy saving?			
How motivated are people to save energy?			
People are motivated and influence others to save energy			
People are motivated and act on an individual basis			
People are motivated but enthusiasm is lost due to general apathy			
No-one is motivated to save energy			



Annex 2: Energy Management System Assessment Template

Energy Management Assessment (EMA) Management Commitment

This section identifies whether there is a clear statement of policy that shows the commitment of management to the efficient use of energy, an associated written strategy, and whether there are suitable allocations of responsibility for energy management with adequate resources assigned.

Energy Policy

Characteristic	Score		Notes
	Actual	Max	
A written energy policy (may be part of an environmental or sustainability policy)		2	
Agreed by senior management		2	
Communicated to all employees		1	
Recently written or reviewed and revised (within 3 years)		1	
Contains a commitment to the development / deployment of quantitative improvement targets		2	
Contains a commitment to annual reporting (public or to all employees)		1	
Includes a date for review/revision		1	
Total Score	0	of 10 maximum	

Energy Strategy

Characteristic	Score		Notes
	Actual	Max	
A written strategy document consistent with the energy policy		4	
Agreed by senior management		2	
Includes a live Action Plan for implementation		3	
Includes a date for review/revision		1	
Total Score	0	of 10 maximum	



Organisational Structure

Characteristic	Score		Notes
	Actual	Max	
A manager at board (or equivalent) level has responsibility for energy		3	
Appointment of person with designated responsibility for energy		3	
Clear job description and assigned adequate resources for designated person		3	
Regular management meetings to review energy use		2	
Local energy managers or champions appointed		1	
Total Score	0	of 12 maximum	

Regulatory Compliance

This section identifies whether there is a clear understanding of the organisation's legal obligations in respect to energy and carbon emissions, and whether these obligations are being managed effectively.

Characteristic	Score		Notes
	Actual	Max	
Formal review completed to determine which regulations are applicable and which are not		2	
Senior management has reviewed and understood the organisation's legal obligations		2	
A compliance plan is in place, including identified responsible staff		2	
Processes are in place to ensure the organisation keeps up to date with relevant developments		2	
The organisation is compliant		2	
Total Score	0	of 10 maximum	



Procurement and Investment

This section identifies whether the organisation's procurement and investment policies and procedures provide active support for improvements to energy efficiency.

Procurement Policy

Characteristic	Score		Notes
	Actual	Max	
General policy includes consideration of energy consumption in all procurement		4	
Energy performance is specified in new buildings, IT projects, process plant etc		3	
Specific procurement policies used for particular products, e.g. lighting, motors etc.		3	
Total Score	0	of 10 maximum	

Investment Procedures

Characteristic	Score		Notes
	Actual	Max	
Capital investment procedure exists to obtain funding for energy efficiency		4	
Clear payback (or other) investment threshold for energy efficiency		3	
All capital funding requests assessed for energy impact by person with responsibility for energy		3	
Maintenance budgets include repairs to save energy		2	
Total Score	0	of 12 maximum	



Energy Information Systems & Identifying Opportunities

This section identifies whether there are systematic procedures for monitoring and understanding energy consumption, setting suitable improvement targets, and identifying savings opportunities.

Monitoring & Analysing Energy Use

Characteristic	Score		Notes
	Actual	Max	
Regular collection of energy consumption and cost data		4	
Analysis of consumption against energy drivers (production, temperature, etc.) and time		4	
Regular and appropriate reporting		3	
Comparison of energy data with utility bills		2	
CO ₂ emissions calculated/analysed		1	
Total Score	0	of 14 maximum	

Target Setting

Characteristic	Score		Notes
	Actual	Max	
Energy saving targets based on analysis		3	
Targets are SMART, challenging, but achievable		4	
Performance compared with appropriate benchmarks (internal or external)		3	
Total Score	0	of 10 maximum	

Identifying Opportunists

Characteristic	Score		Notes
	Actual	Max	
Metering, Monitoring and Targeting (MM&T) system actively used to identify savings opportunities		4	
Site energy surveys undertaken regularly		4	
Other information used, e.g. energy certificates, asset registers, etc.		2	
Total Score	0	of 10 maximum	



Culture & Communications

This section identifies whether the opportunities afforded through involving staff in energy efficiency, and in communicating progress both internally and externally are being taken advantage of.

Staff Engagement & Training

Characteristic	Score		Notes
	Actual	Max	
Appropriate training for staff key to energy management, e.g. maintenance, boiler-house, caretakers, security, etc.		4	
Awareness campaigns held regularly		3	
Wider active staff involvement initiatives (e.g. via 'green' programmes, quality improvement, etc.)		2	
Energy included in staff induction training		1	
Total Score	0	of 10 maximum	

Operational Procedures

Characteristic	Score		Notes
	Actual	Max	
Active reporting systems for energy waste and suggestions (lights on, doors open, steam leaks etc.)		3	
Job/Priority sheets for reducing energy waste (e.g. repair compressed air leak)		2	
Maintenance schedules include reducing energy wastage		2	
Operating instructions include energy use issues (e.g. shut down procedures)		3	
Total Score	0	of 10 maximum	

Communications

Characteristic	Score		Notes
	Actual	Max	
Regular communications to all employees on initiatives and progress against the strategy and targets		4	
Performance against strategy and targets published publicly in organisation's annual reports or similar		3	
Energy/carbon included in regular communications to wider stakeholders (local community, etc.)		3	
Total Score	0	of 10 maximum	



Arab Potash Company Jump to Excellence Project



CONTEXT

Arab Potash Company, like many other fertilizers' companies in our Association has been facing significant challenges on sourcing reliable and cost efficient energy. In particular, there has been a volatile price of Heavy Fuel Oil and an exponential increase in electricity prices. In addition, our market is getting more competitive each year.

Due to this situation, APC initiated various actions to mitigate the impact of rising energy costs through engagement in various capital projects, and initiation of a change management project to manage energy in a different way throughout all levels of the company.

Initially, there was a creation of the Energy Management Committee with participation of employees from various departments and management levels. The objective of this committee was to identify and implement initiatives and opportunities to improve energy efficiency and reduce the energy cost at APC.

In addition, APC started a business improvement project in October 2014 which covered areas of process operations, procurement, maintenance, logistics, project management and energy management.

The aim of our aptly named "Jump to Excellence" project is to cut costs by reducing wastes, increasing efficiency and increasing productivity. These were achieved through accelerating the pace of change, implementing corporate strategies by means of an improved focus on implementing the existing initiatives and identifying new ones.



CHANGES CONDUCTED

Process

- Process monitoring: through parameters' short-interval (hourly) logging in all operational areas
- Hourly monitoring of water, fuel and electricity consumptions in the main consumer areas and on a daily basis in other supporting departments
- Maximizing power generation in the Power Plant to face the increase of the cost of the imported electrical power
- Enhancement of maintenance efficiency on jobs related to energy losses

System

- New structure for meetings and reports
- Management through the introduction of KPI's and clear targets broken down by plants and equipment
- Management by exception
- Structured opportunity management
- Trend analysis
- Enhancement of capital projects reports & structure through a Project Management Office

Behavior and culture

- Waste identification training
- Leak identification program
- Sharing information through bi-weekly Newsletters
- Engagement of workforce using toolbox talks
- Coaching program for supervisors with a strong focus on safety and energy management
- Sustainable coaching on active management behaviours for supervisory and managerial levels



RESULTS & SUCCESS FACTORS

- Maximizing electricity generation in the Power Plant resulted in 4.2 M JOD annualized benefits
- Utilization of Water from Issal Valley. Expected annualized savings of 300,000 JOD
- Replacement of normal lighting fixtures with LED lighting units generated annualized benefits of 1.3 M JOD
- Initiating an opportunity log with more than 70 opportunities for energy efficiency improvements in all the plants in APC. The implementation resulted in the following improvements:

Consumptions Per Each Ton of Potash

Plants	Electrical (kWh/Ton)		Fuel (kg/Ton)		Water (m ³ /Ton)		Steam (Ton/Ton)	
	Before	After	Before	After	Before	After	Before	After
HLP	90.70	86.78	11.5	10.54	5.10	4.93	0.57	0.50
CCP1	60.4	54.45	13.6	9.66	3.90	3.42		
CCP2	105.4	81.3	13.6	11.32	4.7	3.02		

