



# IN FACTORIES

Conserve Electricity and Water For A better Tomorrow



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## INTRODUCTION

Energy and water resources in the UAE and around the world are slowly depleting as demand increases, and it is up to us to work hard to conserve what we have. The UAE is one of the major consumers of electricity and is the world's third largest per capita water consumer after the USA and Canada.

Contrary to what many think, our resources will not last forever. So it is in every industry's domain to be responsible and do its part in helping us conserve our water and energy, so that generations after us can also use what we have today.

**Factories across the world are becoming increasingly-aware of their responsibility towards resource conservation and now it's your turn. Following are some tips to help lower your factory's consumption and save on water and energy costs. We hope that these environmentally responsible practices will prove beneficial to your business as well as to our resources and environment.**



# ELECTRICITY SAVING TIPS

Set the thermostats at 24°C or 75°F during working hours, and shut off at the end of the workday.

If air conditioning units are over 10 years old then energy costs will be higher than the energy costs of most high-efficiency air conditioners available today.

- Use high-efficient appliances and equipment. In most factories, production equipment is the greatest contributor to electricity costs
- Use motors with Variable Speed Drive (VSD)
- Avoid operating secondary equipment during peak hours, from 12 pm to 5 pm during summer months (May-September), if possible
- Conduct daily maintenance work during peak hours, if possible, especially during summer months
- Conduct annual maintenance work during summer months, especially July, August and September, if possible.

- Maximise production outside peak hours, or lower production during peak hours in the summer if possible
- Set the thermostats at 24°C or 75°F during working hours, and shut off at the end of the workday. If air conditioning units are over 10 years old then energy costs will be higher than the energy costs of most high-efficiency air conditioners available today
- Avoid keeping thermostats close to equipment and machinery
- Make use of natural daylight as much as possible, and switch off lighting in areas where natural lighting is available
- Install compact fluorescent lamps (CFL). CFL uses about one-quarter of the energy and its lifetime is 10 times longer than regular incandescent bulbs. It will save you thousands of dirhams every year
- Use electronic ballast with the fluorescent tubes to save about 10% of the consumption per lamp
- Conduct water and electricity audits and prepare periodical reports on the factory's energy and water consumption to monitor electricity and water usage
- If possible, replace water-cooled chillers instead of air-cooled chillers
- Fix all leaks in pressurised air systems
- Replace belt drives on motor systems. Consider using Cogged V-belts. They are more expensive than standard belts but can reduce motor output losses by almost a half





- Switch off unused equipment
- Make sure that all electric connections around the factory are tight
- Regularly provide preventive maintenance to all machinery and equipment.
- Replace old machinery or ones that breakdown often with new more efficient equipment
- Clean all machinery and equipment regularly to maximise their efficiency
- Insulate water pipes, water heaters and storage tanks
- Make sure office equipment are used efficiently in the office areas. (e.g. copiers, fax machines, computers, printers etc.). Switch them off after use
- Make sure that all lighting and air conditioning is switched off in areas not regularly used
- Consider installing solar water heaters and outdoor solar lighting. Look into other solar powered equipment and applications or ones that run on other renewable energy resources
- Seal and weather - strip doors and windows that leak air. Monitor external doors, windows and outside walls for gaps, cracks and unnecessary openings to minimise cooled air escape
- Install Light Emitting Diodes (LED) in areas where the lighting is on continuously or for long periods. (e.g. exit signs, other signs, stairwells, etc.)
- Apply reflecting coating to old roofs
- Encourage staff to use stairs instead of elevators if they are not carrying loads





# WATER SAVING TIPS

Place a small plastic bottle filled with water or sand in the toilet flush tanks to reduce the amount of water used in each flush. Or consider replacing old toilets with new high-efficiency toilets that save water and have a dual flush system.



- Install a calibrated water control system for all washrooms that control water pressure and flow, or fit taps and showerheads with water flow reducers or aerators. Water flow reducers on taps can save 30% of water. Install tap timers in public / staff washrooms
- Place a small plastic bottle filled with water or sand in the toilet flush tanks to reduce the amount of water used in each flush. Or consider replacing old toilets with new high-efficiency toilets that save

water and have a dual flush system

- Use treated sewage effluent (TSE) water, which is provided by Dubai Municipality to irrigate the gardens and plant
- Install timers on irrigation systems. Use drip irrigation systems for water efficiency
- Regularly check pipes and other systems for leaks and provide repair work immediately. Provide regular maintenance to the factory's plumbing system

- Consider installing water re-circulating, re-cycling or re-claiming systems, so that the water may be used for various purposes instead of going to waste
- Re-use waste water generated during production
- If your company uses water to wash down waste material, use sprayers that are high-pressure but low volume
- Try and remove waste in dry mode if possible. This saves water and avoids

chemicals going down the sewerage system. Pulses to lower the amount of water that is needed for washing

- If your factory operations consume a lot of water daily, consider expanding water agency storage tank operating reserves, as this ensures less pumping power will be required during peak hours. Invest in specialised software programs that help monitor water levels and supply



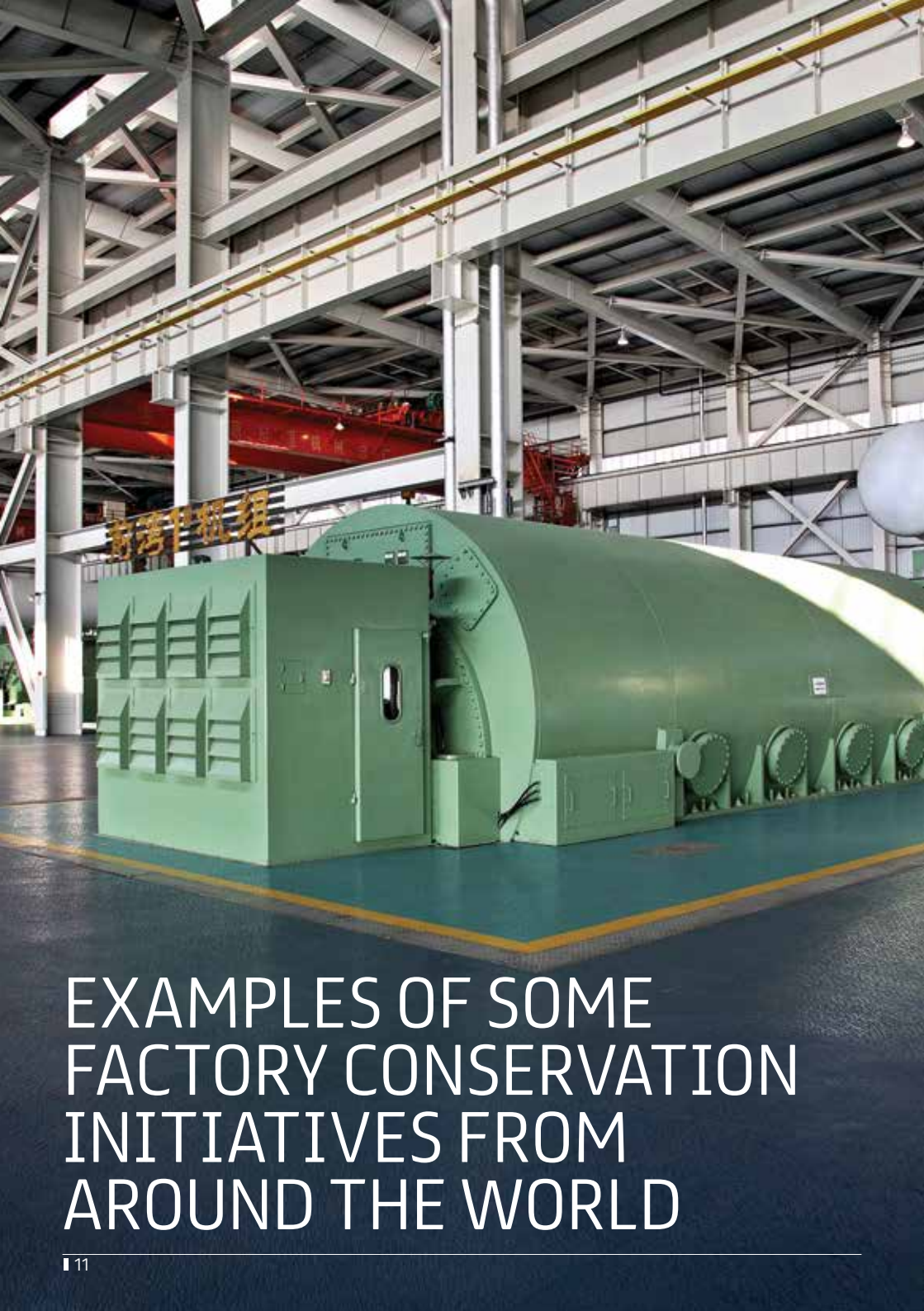
# GENERAL TIPS

Recycle materials (glass, plastic, aluminum, cans, waste materials from production, etc.).



- Educate and provide training to all employees on water and electricity conservation
- Consider offering staff incentives for helping to conserve and improve efficiency. Encourage them to participate in suggestion schemes that would help save water and energy
- Draw up a checklist for all staff to remind them about water and electricity conservation practices. This checklist should be posted at all areas of the company/factory
- Little stickers/notes should be put up in specific areas to remind staff. For example, put up a note that reads "Switch off all equipment after use" in the main machinery or production areas
- Properly dispose hazardous waste and conduct pollution control measures
- Minimise the production of waste and emissions as much as possible
- Regularly conduct inspections of all departments to make sure that energy and water conservation methods are being followed





# EXAMPLES OF SOME FACTORY CONSERVATION INITIATIVES FROM AROUND THE WORLD

- **El-Nasr Company** for Spinning and Weaving in Egypt installed automatic shut-off valves in their bleaching ranges. The bleaching ranges at the company consumed process water and steam even when they were not in use. The shut-off valves were installed at various control points to avoid water, steam and chemical wastage. Another water saving measure they took, was recovering steam from various processing departments into condensate and storing it in a water collection tank that is used for other purposes
- Rail Wheel Factory, in Bangalore, India, provide continuous monitoring of the operations of arc furnaces, circulating water pumps and other equipment, plus quick action taken towards air and water leakages, which has resulted in considerable energy and water savings. They have also installed solar water heaters
- **Komatsu Company** implemented measures such as cutting stand-by electricity of manufacturing equipment, replacing lights with high efficiency lighting, the plant roofs were painted with heat-insulated paint and washed items are dried using air blowing. They also reuse waste water
- In a **tuna pet food plant** in Thailand, measures were taken to lower their high water consumption. They installed pressure-spraying nozzles for spray cooling, reduced valve opening for can washing, and educated the plant staff on water conservation measures and floor cleaning. Overall water consumption was reduced by 32%
- **Yachiyo Industry Co.** an automobile factory, took measures to get zero waste

water, which was achieved for the first time in the automobile industry. They maximised water-recycling efficiency in its repair parts production area. They also installed water-purifying devices to treat water for use in other factory areas

- **Ford's Bridgend Engine Plant** in Wales has installed 26 solar units on the roof of their facility. Each unit consists of 1,540 photovoltaic cells that convert sunlight to electricity. It is the largest grid-connected solar installation in an automotive plant in Europe, and the first of its kind in this industry in the world. This measure has prevented emissions being discharged into the air and has made significant reductions in the plant's overall electricity consumption
- Auto maker **Toyota** has replaced multiple production lines with single lines that are able to produce various vehicles. This has decreased their energy consumption by around 40%. A welding system was also put in place in all of its plants that speeded up production, cut energy and other costs. Since less electricity was being consumed, it led to a 50% reduction in CO2 emissions
- **Honda of America** (Honda's production base in North America), manage the use of water and energy to maximise efficiency, and have saved 53% in energy costs by replacing hydraulic motors with electric motors to transport paint to the coating process area. At Honda Thailand, they installed fluorescent lighting, and have installed skylights in the roof of the factory. Natural light comes in through them, which means that lights do not have to be turned on during the day. At **Honda Verno Kobe**, a unit was installed to monitor energy consumption, which revealed



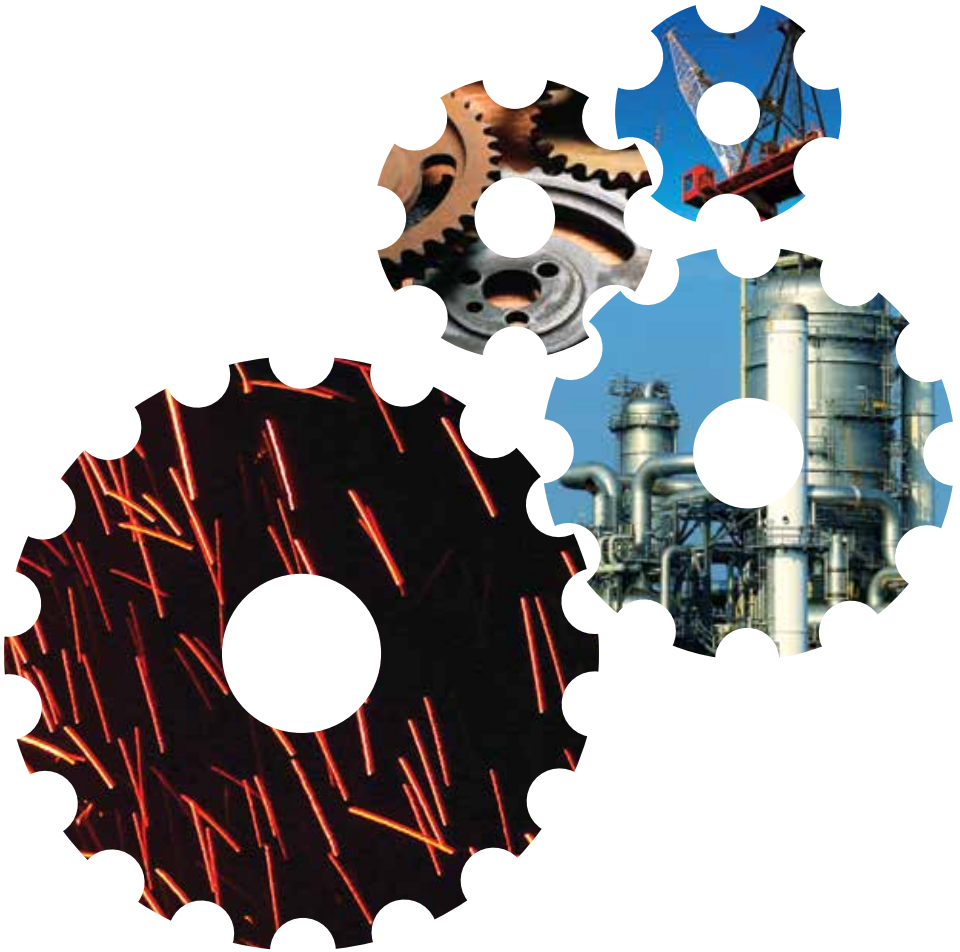
that lighting was being consumed even on holidays. After this finding, the company turns off electricity at the distribution board on the day before the holiday. A timer is also installed, and delivery of automobiles is not set at a one fixed time, so that energy consumption can be spread. These measures have cut back power costs at the company by 12%

- **Asociacion de Productores de Cervatenos** is a small agro industry plant in Costa Rica. It refurbished unused washing machines, installed a high-pressure water spout to clean conveyors and processing tools, fixed the thermostats of their Quick Freezing Machine, and installed water sprayers in all of the plant's waterspouts. These small in-expensive measures have saved the plant around \$10,000 a year
- **Vam Organic Chemicals Limited** in India, manufacturers and distributors of organic chemicals, is a water intensive industry. Measures to lower water consumption included optimisation of a plant of their distillery, installed a cooling tower, recycling of sealing

water of vacuum pumps, replacing fresh water for dilution use and other uses around the plant with recycled water. These initiatives save the plant around \$33,330 a year

- **Texas Instruments'** factory in Dallas, USA, have big water pipes with few elbows that lower friction loss, and use small pumps, all of which reduce energy. Solar equipment were incorporated in their building design, and their roofs have a reflective white coating that reduces heat. Air is cooled and recovered naturally, and the factory was able to get rid of a huge industrial air conditioner. Almost all waste from construction is recycled as well
- **Epson** is redesigning their semiconductor plants and is planning to set up "green factories" by 2010 that will reduce water and electricity consumption and reduce waste. They will set up clean rooms that will have their own air conditioning and water purification that are flexible with their output demands and where small-lot processing can take place





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