SWITCHING THE LIGHTING: FROM INCANDESCENT BULBS TO CFL AND LED

It is common knowledge: the easiest energy efficiency program to implement is in the lighting sector.

In an academic study conducted in 2004, the share of lighting in total energy consumption in the building sector in Lebanon was found to be approximately 8.5%.
CEDRO commissioned energy assessments on a number of selected institutions in order to implement a project to improve the efficiency of their lighting systems. Energy audits of these buildings, conducted by the Lebanese Center for Energy Conservation (LCEC), found that lighting accounted for approximately 13% of the total electricity load.

Although further and more up-to-date research is needed, there is clearly a significant potential for reducing the lighting load in domestic and commercial buildings in Lebanon by replacing the currently inefficient incandescent lamps with either compact fluorescent lamps (CFLs), or light emitting diodes (LED).

The CEDRO project consists of replacing all the magnetic ballasts in existing fluorescent tubes with electronic ballasts, replacing incandescent light bulbs with compact fluorescent lamps, and replacing metal halide with ceramic ones. All of these changes provide the same luminance and light quality, but for lower wattage, and therefore lead to less energy consumption and lower energy costs. The exact value of the savings will be documented after the final implementation of the project.

Ten institutions have been selected for an upgrade in their lighting efficiencies: the Council for Development and Research (CDR), the Bassel Fleihan Financial Institute, the VAT building, Banque Du Liban - Bekfaya, the Lebanese Agricultural Research Institute (LARI), the Lebanese University - Faculty of Agriculture, Hammana's Municipality building, Zahleh's Municipality building, the Ministry of Social Affairs, and the Regie building in Hadath.

The success of this project lies in the measures the Government of Lebanon will take with respect to lighting. The European Union (EU), for instance, has agreed to phase-out incandescent lamps on its territory by 2012, a measure which will ensure that all sectors in the EU convert to energy efficient lighting. The current CEDRO project supports and encourages a similar phasing-out scheme for Lebanon, and fits within the larger picture that the LCEC and the Ministry of Energy and Water (MEW) have drawn for this sector.

CEDRO
CEDRO, with energy efficiency on our mind
Country Energy Efficiency and Renewable Energy Demonstration Project for the Recovery of Lebanon
ISSUE # 3 JULY 2010

CEDRO INITIATES THE NATIONAL BIOENERGY STRATEGY

By 2020, 12% of Lebanon's energy mix is to be supplied from renewable energy sources. This is the target the Lebanese government set for itself in a ministerial declaration, a target that was reasserted at the Copenhagen summit late last year.

To this end, CEDRO has initiated a study to assess the total bioenergy potential of Lebanon. Thirteen bidders are currently being evaluated, from which one winner will be selected. The purpose of the study is to ensure that the potential of all bioenergy resources in Lebanon that are technically and sustainably feasible are surveyed, pegged to their respective technological requirements, and built into future scenarios of bioenergy uptake in Lebanon. These scenarios are to abide by strict 'sustainability criteria,' which assess the social, economic, and environmental benefits or costs of the proposed bioenergy levels, in order to ensure that there are no negative impacts on the environment, on food quantities and prices, or on other important socio-economic criteria.

In collaboration with the Ministry of Energy and Water, CEDRO is currently preparing a number of similar studies. The wind atlas is expected in late November, and the CEDRO team is currently assessing the need to implement a hydro-power study, following the same reasoning as the bioenergy study. CEDRO's final goal, which it hopes to reach within a maximum of 2 years, is to assist the government in obtaining solid information and studies on the country's renewable potential (and the economic impact in costs and benefits), so that it can then decide which renewable sources to invest in first in order to meet the 2020 target.

This 12% energy target has yet to be disaggregated into its various possible components, such as hydro-power (which already accounts for up to 4% of the electricity mix in Lebanon), wind energy, solar power, and other possible sources, such as those that may be delivered from biomass – what is known as bioenergy. Bioenergy sources meet on average 6.7% of the EU-27s energy consumption, for instance. In some EU-member countries bioenergy represents between 5% (Greece, Spain, Hungry) and 15% (Portugal, Austria, Denmark) of total energy consumption, while it represents up to 25% of the total energy consumption of countries such as Sweden and Finland. In comparison, the use of biomass in Lebanon remains negligible and is limited mostly to the use of wood for heating.

To optimize alternative energy resources, bioenergy is a carbon-neutral energy option that needs to be analyzed in Lebanon, given that it is widespread, diverse and renewable. It may significantly contribute to the security of energy supply, the diversification of our energy sources, and the reduction of GHG emissions from energy end-use. It also has the side benefits of boosting rural development and providing new economic opportunities.

Biomass is defined as material of recent biological origin, derived from plant or animal matter. To create bioenergy, biomass can be combusted to generate heat and power, or converted into bio-fuels or renewable gas.

Biomass used for heat and power can be sourced from conventional forestry management, such as the thinning, felling and coppicing of sustainably managed forests, parklands and trees from other green spaces. It also includes sawmill residues (often processed to produce wood pellets), other wood processing residues and parts of trees unsuitable for the timber industry. Another source of biomass comes from agricultural crops grown primarily to be used in energy

Energy in the making

generation ('energy crops'), and agricultural residues, such as straw, husks and kernels. Biomass can also be derived from biodegradable waste and other similar materials, including sewage sludge, animal manure, waste wood from construction, and food waste that would otherwise be disposed of in landfills. A last source of biomass is 'landfill biogas,' which is biogas obtained by the forced degasification of existing landfills.

Biomass can also provide energy for transportation or be used as renewable gas. Two liquid biofuels are in commercial production for transport: bio-ethanol, made from fermenting agricultural crops, such as sugar cane, sugar beet or wheat; and biodiesel, produced from oily crops, such as sunflowers, olive trees and oilseed rape, or by processing oily wastes, such as cooking oil and animal fats. Biomass as renewable gas can be in the form of biogas and syngas. Biogas can be produced from the decomposition of biomass in the absence of oxygen, a process known as anaerobic digestion (AD). AD can be used on farms to process animal slurries and other agricultural residues; by the water industry to process sewage sludge; and to process food waste that would otherwise be land-filled. In all cases it produces a valuable methane-rich gas which (after purification) can be used in the same manner as natural gas to generate energy for electricity, heat and transport.

CEDRO
Beirut, Maarad street, Building 287 B, 1st floor, Lebanon
T/F: +961-1-981944
E: cedro@undp-lebprojects.org
www.cedro-undp.org

CEDRO LIGHTS THE WAY

MINISTER OF ENERGY AND WATER AND THE SPANISH AMBASSADOR INAUGURATE THE FIRST MUNICIPAL SOLAR STREET LIGHTING SYSTEM IN ASSIA, BATROUN

April 17th, 2010, marked the inaugural ceremony of the first experimental phase of the municipal solar street lighting system in Assia, Batroun.

This achievement is part of the Country Energy Efficiency and Renewable Energy Demonstration Project for the Recovery of Lebanon (CEDRO). The ceremony was held under the auspices and in the presence of the Minister of Energy and Water, Mr. Gebran Bassil, the UNDP resident representative, Ms. Marta Ruedas, represented by Mr. Edgard Chehab, Spain's Ambassador to Lebanon, Mr. Juan Carlos Gafo, representatives of the Ministers of Interior and Labor, area deputies, and 400 guests.

The Spanish Ambassador said that this project would represent a joint achievement within what is expected to be an «increasingly fruitful collaboration between the Spanish and Lebanese governments,» and serves as a clear example of Spain's commitment to the development of Lebanon.

Mr. Emile Bedran, President of the Municipality of Assia, said that this is a notable first in the area, especially since Lebanon enjoys a large number of sunny days. He expressed his hope that similar projects will be implemented in the 73 villages of the Batroun through the UNDP.

The ceremony ended on a bright note, with the lighting of the road.

HE Mr. Gebran Bassil

His Excellence Juan Carlos Gafo

Mr. Edgard Chehab

Mr. Emile Bedran

CEDRO PV WORKSHOP

A workshop held by CEDRO in collaboration with its Spanish backstopping firm, Trama TecnoAmbiental(TTA), reached a general consensus on the great potential that photovoltaic (PV) systems have in the country.

The workshop clarified some technical aspects of PV systems capacities, and allowed a fruitful exchange of experiences and views on the most convenient approach to tap the PV market in Lebanon. The event drew attention to the fact that the deployment of PV technology on the local market is mainly hindered by the lack of regulations governing the possibility to connect to the EDL gridlines. During the workshop, different examples of grid-connection strategies were discussed.

The workshop introduced participants to photovoltaic electricity and the general costs and benefits of the system. Costs are mostly related to upfront investments in capital equipment (panels, inverters, controllers, and back-up battery storage) and installation, while the major benefit is renewable and clean electricity generation that would reduce the need for imported electricity and provide electricity in times of power cuts.

An example of operation and maintenance procedures of PV systems was presented, based on a case study of a public school in Lebanon. The workshop, held on December 8th, 2009, at the Gefinor Rotana Hotel, was attended by more than 70 people, representing the Ministry for

A full-house at the CEDRO PV workshop

Energy and Water, EDL, the Lebanese Army, governmental agencies, non-governmental organizations, academic and private sector representatives, as well as some of the beneficiaries of the 25 PV sites who made their way to Beirut from Akkar, the South, or the Bekaa.

Presentations delivered at the event can be downloaded from the CEDRO website on http://www.cedro-undp.org.

MORE SOLAR HOT WATER FROM CEDRO

Following the successful installation of large Solar Hot Water (SHW) systems in the governmental hospitals of Saida (8,000 liters), Jezzine (3,000 liters), Abdullah El-Rasi (4,000 liters), and Hermel (4,000 liters), CEDRO has begun the implementation of 6 additional compounds. Five of these are public hospitals: Ehden (400 liters), Sir El Donnieh (2,000 liters), Sebline (6,000 liters), Keserwan (6,000 liters), and Tripoli (12,000 liters). The sixth SHW beneficiary is the army barracks at the Baalbeck Army Teaching Institute, consisting of two 12,000-liter SHW systems to be installed on two separate buildings within the same compound. The Lebanese Armed Forces (LAF) places a high priority at this compound, since it is the training ground of new recruits and non-commissioned officers for the army and other armed forces. The compound has a constant influx of new trainees, and almost always houses more than 2,400 soldiers.

The Internal Security Forces (ISF) have also benefited from SHW systems through CEDRO. In fact, CEDRO's single largest SHW project, which is currently under the bidding process, is intended for Roumieh Prison. Prisoners there have very limited access to hot water and lack adequate showering facilities. To heat water for showers, prisoners usually use a private heating resistor to heat a bucket of water inside their rooms. This practice has several security drawbacks for the prisoners and the prison authorities. The installation of the solar water heating system will not just provide hot water for the prisoners, but can also help security guards regulate prisoners' showering habits and hours.

CEDRO has received positive feedback on the SHW projects it has already implemented. According to Dr. Simon Nasereldine, CEO and Director of Hermel Governmental Hospital, and Mr. Ali Abed El-Jawad, CEO of the Saida Governmental Hospital, the installed systems have knocked off around 40% of the hospitals' total energy bills. Dr. Diana Aoun, director of Jezzine Governmental Hospital, didn't turn on the auxiliary diesel boiler in May even once, and expects a similar positive outlook for the rest of spring and summer.

The savings in diesel oil and the resulting environmental benefits are to be documented by the CEDRO team in the near future, as all installations come equipped with data loggers. This will enable a more scientific and accurate evaluation of the technical and economic performances of these systems.