Industry and Energy Management: Options and Possibilities

Hassan Harajli
July 27th, 2016
UNDP CEDRO & Satellite Projects (2007-2016)

- Since 2007, approximately $20.2 million have been and are being directly disbursed for implementation of RE and EE projects, assessments, and activities by the CEDRO project.
- CEDRO 1,2,3 was funded by the Spanish Government through the Lebanon Recovery Fund
- CEDRO 4 is European Union (EU) funded (with a contribution from the Lebanese private sector)
- All other host community projects have been enabled by the CEDRO project’s presence and in-kind contribution.
Biomass from Forestry Residues Implementation

- Rice Straw
- Bagasse
- Wood Chips
- Peanut Shells
- Grass
- Bamboo Wastes

Bkessine & Aandket

500 tons per year capacity per site
Ground Source Heat Pump Implementation

The MEDRAR Medical Center (MMC) in the South of Lebanon managed in cooperation with the AUBMC is intended to provide medical care through its various Departments of Excellence.

A Ground Source Heat Pump (GSHP) System of over 180 boreholes of 100m deep will be installed providing the facility’s demand in hot water and heating / cooling demand.
“Green” Model Village Implementation: Kabrikha

A 250 kWp centralized PV system to be installed at Kabrikha

- During blackouts, the PV system will synchronize with the municipal gensets and use these gensets’ locally installed network.
- During power availability (from EDL), the PV will use EDL network.
- Two new concepts are hoped to be achieved:
  + Enabling community led investment models & contracts
  + Enabling community net metering
Currently Implemented novel commercial-sized PV systems

<table>
<thead>
<tr>
<th>Company</th>
<th>Power Capacity</th>
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<tbody>
<tr>
<td>USEK</td>
<td>212 kWp</td>
</tr>
<tr>
<td>Gemayel Freres sal</td>
<td>300 kWp</td>
</tr>
<tr>
<td>LibanJus</td>
<td>130 kWp</td>
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<tr>
<td>Libanlait</td>
<td>214 kWp</td>
</tr>
<tr>
<td>RMF</td>
<td>130 kWp (EU-MEDSOLAR)</td>
</tr>
<tr>
<td>Emkab</td>
<td>120 kWp (EU-MEDSOLAR)</td>
</tr>
<tr>
<td>JIIO MEDRAR</td>
<td>120 kWp (EU-MEDSOLAR)</td>
</tr>
<tr>
<td>American University of Beirut</td>
<td>140 kWp (EU-MEDSOLAR)</td>
</tr>
</tbody>
</table>

Approximately 1.36 MW of Solar PV capacity – hybrid systems with diesel gensets

Many additional projects from DREG
Gemayel Freres 300 kWp – Mount Lebanon
LibanLait 214 kWp – Bekaa
LibanJus 130 kWp – Beirut
RWF 130 kWp – North Lebanon
Distribution of industrial establishments by economic activity in 2007

Lebanese Industry
Why the focus on energy management?
1. Increasing our energy security

MOE/GEF/UNDP (CCCU), 2015
2. Cost of energy

Pre: 2010-2015

Post: 2010-2015
2. Cost of Input

Cost of production

Revenue

CAN! I CAN'T!
CONTROL

LEBANON

CLOSET
3. Reducing our GHGs

Contribution of energy emission sources to the sector’s total for 2011

MOE/GEF/UNDP (CCCU), 2015
4. The low hanging fruit?
The options set out in this conference

Energy input = Output

Energy input = Output
Energy Efficiency options

MONITORING & ENERGY MANAGEMENT
- Energy Metering & Control
- Peak Hours Management

COMPRESSED AIR SYSTEM
- System Optimization
- Leakage Prevention
- Temperature Optimization
- Pressure Reduction

STEAM SYSTEM
- Combustion Optimization
- Condensate Return
- Blow-down Steam Recovery
- Thermal Insulation
- Steam Traps Management
- Steam Leakage Repair

HEAT RECOVERY
- Economizer
- Exhaust Gas Boiler
- Heat Exchanger – Jacket Water
- Absorption Chiller
Energy Efficiency in the Lebanese Industrial Sector

Solar Energy

Electricity

Heat and/or Electricity
### Energy Management in the Lebanese Industrial Sector

#### Day 1, July 27th 2016

**9:00 - 9:30** Registration

**9:30 - 10:30** Opening

- Dr. Fadi Gemayel, President, Association of Lebanese Industrialists (ALI)
- Dr. Bassam Fmann, Director General, Industrial Research Institute (IRI)
- H.E. Philippe Iazzirini, Resident Representative, United Nations Development Programme (UNDP) Lebanon
- H.E. Christine Lassan, Head of the European Union (EU) Delegation to Lebanon
- H.E. Dr. Hussein Haj Hassan, Minister of Industry
- H.E. Mr. Arthur Nazarian, Minister of Energy and Water

Moderated by Mr. Ziad El Zain, Vice President of the Board & Head of PR and Finance, LCEC

**Coffee Break: 10:30 - 11:00**

**11:00 - 11:30** Energy Security and Industry

- Dr. Hassan Harajli, EU UNDP-CEDRO Project Manager
  - Energy Use and the Lebanese Industry: Perspectives from the EU-financed UNDP-CEDRO project.
- Mr. Jal Amnine, GEF UNDRREG Project Manager
  - Energy Use and the Lebanese Industry: Perspectives from the GEF-financed UNDRREG Project.

**11:30 - 12:15** Energy Efficiency for Industry

- H.E. Dr. Nadir Haj Shazadah, Senior Consultant, Energy Efficiency Group (EEG)
- 12:15 - 13:00 Perspectives from IRI and UNIDO

**13:00 - 14:00** Lunch

**14:00 - 15:00** Solar Photovoltaic Power for Industry

- Mr. Xavier Villalba, Director, Trama Techno Ambiental (TTA), Barcelona, Spain.
  - The Solar Photovoltaic (PV) – Hybrid Power Plant PV hybrid power plants for industrial, commercial and institutional applications in Lebanon.

**Short Coffee Break: 15:00 - 15:15**

**15:15 - 16:30** Sustainable Energy Case Studies: Take it from industrialists

- Ms. Rima Hayek, Quality Management and Social Responsibility Manager, Gemayel Fries<br />  - A Definite Shift to Renewable Energy
- Mr. Nadim Gharios, Director, Business Development, Libanlux<br />  - Green Initiatives at Libanlux
- Mr. Marc Walek, Farm Manager, Libanlux
  - Relying on Solar Power

#### Day 2, July 28th 2016

**9:00 - 09:30** Registration

**9:30 - 11:30** The NEEREA Financing Process

**9:30 - 10:00**

- Ms. Melda Jabbour, Programme Engineer, LCEC
- NEEREA and Industry: Real examples

**10:00 - 10:45** Concentrated Solar Thermal Technology

**10:45 - 11:30**

- Mr. Dirk Krüger, Deutsches Zentrum für Luft- und Raumfahrt - Institute of Solar Research (DLR), Köln, Germany
  - Concentrating Solar Thermal Technology and Solar Process Heat Projects: A focus on the MENA Region

**Coffee Break: 11:30 - 11:50**

**11:50 - 12:30**

- Mr. Martin Haag, Industrial Solar GmbH, Freiburg, Germany
  - Methodology for self-assessment for solar process heat

**12:30 - 13:10**

- Mr. Dirk Krüger, DLR

**13:10 - 14:30**

- Mr. Martin Haag, Industrial Solar GmbH
  - Macro-perspectives on solar process heating

**14:30 - 17:00** Bilateral discussions with interested industrial companies on the feasibility of solar heat generation and solar hybrid technologies (timetable reservation required)
A final word of appreciation
Thank you

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