



## PROGRESS REPORT

<b>Reporting UN Organization</b>	: United Nations Development Programme
<b>Country</b>	: Lebanon
<b>Award ID</b>	: 00047251
<b>Award Title</b>	: CEDRO – “Country energy efficiency and renewable energy demonstration project for the recovery of Lebanon”
<b>Award Timeframe</b>	: Oct 2007 – Oct 2013
<b>Award Components</b>	: CEDRO 1 – 00056604 CEDRO 2 – 00060150 CEDRO 3 – 00071261
<b>Reporting Period</b>	: 01 July 2010 to 30 September 2010

### I. PURPOSE

#### Project Summary:

The aim of the CEDRO project is to support Lebanon’s recovery, reconstruction and reform activities and to complement the national power sector reform strategy through the implementation of end-use energy efficiency and renewable energy projects and through the removal of barriers for the promotion of sustainable energy applications in Lebanon. To achieve this, the project will work on three levels: the first involves the establishment of a demonstrative model addressing public sector building and facilities, the second involves the activation of the replication process, and the third involves the triggering of a national sustainable energy strategy and action plan. The CEDRO project is financed through the Lebanon Recovery Fund, and is in-line with Lebanon’s ongoing efforts to improve national patterns of energy consumption and cost.

#### Project Phases and Outputs:

<b>CEDRO 1</b> 2.73 million USD	<ul style="list-style-type: none"> <li>➔ Implementation of end-use energy efficiency and renewable energy demonstration projects for public sector buildings and facilities (50-60 sites in South, Bekaa and Akkar)</li> </ul>
<b>CEDRO 2</b> 3.50 million USD	<ul style="list-style-type: none"> <li>➔ Implementation of end-use energy efficiency and renewable energy applications for public sector buildings and facilities (app. 60 sites across Lebanon)</li> <li>➔ Technology transfer to enable the conversion of other public sector buildings and facilities into energy efficient modalities</li> </ul>
<b>CEDRO 3</b> 3.50 million USD	<ul style="list-style-type: none"> <li>➔ Implementation of end-use energy efficiency and renewable energy applications for public sector buildings and facilities (app. 60 sites across Lebanon)</li> <li>➔ Technology transfer to enable the conversion of other public sector buildings and facilities into energy efficient modalities</li> <li>➔ Research and development to enable the formulation of a national sustainable energy strategy and action plan</li> </ul>

### **Project Linkages to National Priorities and Reconstruction Goals:**

Lebanon imports around 97% of its energy needs in the form of fossil fuel. In 2004, the national energy bill amounted to around 1.6 billion USD (around 20% of the annual public expenditure and around 7.8% of the national GDP), and in 2005 it reached 2.1 billion USD (around 26% of the annual public expenditure and around 10% of the national GDP).

The government of Lebanon has placed the reform of the power sector among its highest national priorities, as outlined in the recovery, reconstruction and reform paper submitted to the Paris 3 conference after the 2006 conflict. However, given the enormity of the challenges faced by the power sector, the power sector reform strategy has concentrated on addressing the energy supply side, without extending the scope to the demand side of energy management.

Knowing that reform on the supply side needs to be accompanied by reform on the demand side, the proposed CEDRO program has sought to complement the national power sector reform strategy by targeting end-use energy conservation and renewable energy demonstrations which will assist in the above categories of demand-supply imbalance, security of supply, diversification of energy sources, economic cost and the environment.

Moreover, the current Lebanese government has set itself a goal of achieving 12% of its total energy needs from renewable energy sources. CEDRO is seeking to assist in achieving this goal through its demonstration projects of various zero carbon to low carbon technologies and its analysis of renewable energy resources.

This project is an initiative by the Government of Spain to assist the Government of Lebanon in its recovery and reconstruction efforts with a clear focus on promoting sustainable energy services and concentrating on public sector buildings and facilities.

This project is in line with Lebanon's recovery, reconstruction and reform objectives, and falls within the Ministry of Energy and Water's main priority to meet national demand for electricity.

### **Project Implementation Partners:**

International Partners: - Spanish Agency for International Cooperation

National Partners: - Ministry of Energy and Water  
and Lebanese Center for Energy Conservation Project (LCECP)  
- Ministry of Finance  
- Council for Development and Reconstruction

## II. RESOURCES

		CEDRO 1	CEDRO 2	CEDRO 3
<b>Total budget approved</b>	:	USD 2,732,240	USD 3,500,000	USD 3,500,000
<b>Total disbursements as for 30 Sept. 2010</b>	:	USD 2,645,459	USD 539,950	USD 129,589
<b>Commitments for next quarter</b>	:	USD 21,000	USD 915,040	USD 89,688
<b>Available Balance</b>	:	USD 65,781	USD 2,045,010	USD 3,280,723

### Budget and Expenditure Breakdown per LRF Category:

CATEGORY	CEDRO1		CEDRO2		CEDRO3	
	Total Budget (USD)	Total Exp. to date (USD)	Total Budget (USD)	Total Exp. to date (USD)	Total Budget (USD)	Total Exp. to date (USD)
<b>1. Personnel</b> (Incl. staff and consultants)	177,000	206,000	220,000	140,020	214,000	0
<b>2. Contracts</b> (Incl. companies, professional services)	220,000	190,077	440,000	79,497	835,700	125,081
<b>3. Training</b> (incl. AV printing / production)	22,000	16,142	40,000	6,610	50,000	0
<b>4. Transport</b> (local)	30,000	38,800	10,000	764	25,000	0
<b>5. Supplies and commodities</b> (Incl. IT equip and rental & maintenance)	36,300	50,387	50,000	31,000	70,000	0
<b>6. Equipment (including installation)</b>	2,030,000	1,995,265	2,450,000	13,200	2,111,500	0
<b>7. Travel</b>	14,000	6,055	15,000	4,000	25,000	1,899
<b>8. Miscellaneous</b>	11,683	11,885	30,000	7,000	21,000	0
<b>9. Agency Management Support (7%)</b>	191,257	130,848	245,000	15,000	147,805	2,609
<b>TOTAL</b>	<b>2,732,240</b>	<b>2,645,459</b>	<b>3,500,000</b>	<b>297,801</b>	<b>3,500,000</b>	<b>129,589</b>

CEDRO Project	CEDRO 1 2.73 million USD	CEDRO 2 3.50 million USD	CEDRO 3 3.50 million USD
Activity Results	Indicators		
<b>1 - Implementation of end-use energy efficiency and renewable energy demonstration projects for public sector buildings and facilities</b>	➔ Identification and Implementation of 50-60 EE/RE demonstration projects in South, Bekaa and Akkar	➔ Identification and Implementation of 60-80 EE/RE demonstration projects the remaining regions of Lebanon	➔ Identification and Implementation of 60-80 EE/RE demonstration projects across Lebanon

<p><b>2 – Outreach and technology transfer to enable the conversion of other public sector buildings and facilities into energy efficient modalities</b></p>	<ul style="list-style-type: none"> <li>➔ Development and implementation of technical workshops and awareness tools</li> </ul>	<ul style="list-style-type: none"> <li>➔ Development and implementation of technical workshops and awareness tools</li> <li>➔ Development of GIS energy data base and EE/RE procurement specs</li> </ul>	<ul style="list-style-type: none"> <li>➔ Development and implementation of technical workshops and awareness tools</li> <li>➔ Development of GIS energy data base and EE/RE procurement specs</li> <li>➔ Validation of project results and development of replication schemes</li> </ul>
<p><b>3 – Research and development to enable the formulation of a national sustainable energy strategy and action plan</b></p>	<p style="text-align: center;">-</p>	<p style="text-align: center;">-</p>	<ul style="list-style-type: none"> <li>➔ Assessment of national renewable energy resources</li> <li>➔ Assessment of national energy efficiency potential</li> <li>➔ Development of national EE/RE strategy &amp; action plan</li> </ul>

**Progress in Project Implementation:**

Activity Results	Activity Actions	Targets for 2010	Status for 2010
<b>1 – Project Management</b>	1.1 Technical Management	<ul style="list-style-type: none"> <li>✓ Organization of 2 technical workshops and end of year project board meeting</li> </ul>	
	1.2 Financial Management	<ul style="list-style-type: none"> <li>✓ Organization of 5 international backstopping missions;</li> </ul>	<ul style="list-style-type: none"> <li>✓ 2 missions completed, 1 mission scheduled for December 2010</li> </ul>
	1.3 Operational Management	<ul style="list-style-type: none"> <li>✓ Issue a report on the status and results of the CEDRO I pilot projects that were already implemented</li> </ul>	<ul style="list-style-type: none"> <li>✓ Task completed</li> </ul>
		<ul style="list-style-type: none"> <li>✓ Provide advisory support services on EE/RE policies and legislations</li> </ul>	<ul style="list-style-type: none"> <li>✓ TTA providing policy recommendations for the large wind sector in Lebanon</li> <li>✓ Expert on PV farm hired on board of CEDRO</li> <li>✓ Expert on CSP farms hired on board of CEDRO</li> </ul>
		<ul style="list-style-type: none"> <li>✓ Attendance of capacity building workshops for CEDRO team</li> </ul>	<ul style="list-style-type: none"> <li>✓ TTA provided PV training to project team</li> <li>✓ Site engineers trained on “economics of RE systems”</li> </ul>
		<ul style="list-style-type: none"> <li>✓ Preparation of regular progress reports;</li> </ul>	<ul style="list-style-type: none"> <li>✓ Quarterly reports submitted in timely manner;</li> </ul>
<b>Activity Results</b>	<b>Activity Actions</b>	<b>Targets for 2010</b>	<b>Status for 2010</b>
<b>2 - Implementation of end-use energy efficiency and renewable energy demonstration projects for public sector buildings and facilities</b>	2.1 Undertake targeted assessment and identification of project beneficiary sites; 2.2 Develop tender documents and undertake bidding & procurement of goods/services; 2.3 Undertake commissioning of works and supervision and	<ul style="list-style-type: none"> <li>✓ Undertaking second EOI for RE/EE suppliers</li> <li>✓ Implementation of 32 demonstration projects;</li> <li>✓ 15 for PV sites pending the acceptance of a donation of 30 kWp of PV modules by the owner of Suntech (which is expected);</li> <li>✓ 10 energy efficient sites (works began);</li> <li>✓ 7 SHW hospital sites</li> <li>✓ 10 thermal insulation sites</li> <li>✓ Preparation of 20 new demonstration projects for implementation; Particularly 10 microwind sites and 10 thermal insulation</li> </ul>	<ul style="list-style-type: none"> <li>✓ Completion of installation on 30 sites featuring photovoltaic systems and solar water heaters, and including: Public Hospitals; 20 Public Schools; 3 Municipalities; 2 Community centers; 3 public street lighting sites;</li> <li>✓ Successful supervision of works for 30 sites;</li> <li>✓ Work for Baalbeck institute (SHW project) under way</li> <li>✓ Work on EE ITB (energy efficient lighting) under way</li> <li>✓ Roumieh prison SHW project implementation under way (many obstacle are being encountered)</li> <li>✓ LED street lighting project being implemented</li> <li>✓ Work for 5 SHW hospitals under way and are soon to be completed</li> <li>✓ Thermal insulation RFP being prepared</li> </ul>

	<p>monitoring of sites; 2.4 Undertake testing of performance &amp; data collection;</p>		<ul style="list-style-type: none"> <li>✓ Networking with potential beneficiaries for the identification of new sites, around 15 new sites have been identified;</li> <li>✓ New sites for potential microwind and PV projects have been identified by CEDRO Team</li> <li>✓ EOI 2010 completed and new winners posted online.</li> <li>✓ Constant cooperation with LCEC and MEW to promote concept of net metering</li> </ul>
Activity Results	Activity Actions	Targets for 2010	Status for 2010
<b>3 – Outreach and technology transfer to enable the conversion of other public sector buildings and facilities into energy efficient modalities</b>	<p>3.1 Develop and implement technical workshops and awareness activities;</p> <p>3.2 Develop GIS energy data base and EE/RE procurement specs;</p> <p>3.3 Validate project results and enable replication schemes;</p>	<ul style="list-style-type: none"> <li>✓ Development and implementation of 2 technical workshops;</li> <li>✓ Continuation and expansion of CEDRO outreach and visibility;</li> <li>✓ Newsletter three to be completed and distributed</li> </ul>	<ul style="list-style-type: none"> <li>✓ Updating project website: <a href="http://www.cedro-undp.org">www.cedro-undp.org</a> (En/Ar);</li> <li>✓ Issuance of third edition of Newsletter (En/Ar) has been completed</li> <li>✓ Documentary on CEDRO on Future news TV show; Blue and Green</li> <li>✓ Brief discussion on PV on Kaleem El Ness by CEDRO project</li> <li>✓ Article on CEDRO in (1) Economy and Business and (2) Environment and Development magazine</li> <li>✓ CEDRO project featured on “Talk in Numbers” on Future news TV</li> </ul>
		<ul style="list-style-type: none"> <li>✓ Set-up of GIS database for 200 public sector sites;</li> </ul>	<ul style="list-style-type: none"> <li>✓ Set-up of GIS database for 100 public sector sites completed;</li> </ul>
<b>4 – Research and development to enable the formulation of a national sustainable energy strategy and action plan</b>	<p>4.1 Asses national renewable energy resources;</p> <p>4.2 Assess national energy efficiency potential;</p> <p>4.3 Develop national EE/RE strategy &amp; action plan;</p>	<ul style="list-style-type: none"> <li>✓ Completion of the Wind ATLAS for Lebanon (expected mid-November 2010).</li> <li>✓ Initiation of a bioenergy assessment of Lebanon</li> <li>✓ Completion of a microwind potential assessment in 10 different sites</li> <li>✓ Net metering pilot to be implemented and policy/legal legislation updated accordingly</li> </ul>	<ul style="list-style-type: none"> <li>✓ Deliverable 1 of wind atlas received</li> <li>✓ bioenergy study initiated, works on the ground have begun</li> <li>✓ microwind potential assessment: bid is out, 12 bidders have submitted and are being evaluated</li> <li>✓ Net metering measuring devices have been purchased for testing and 2 meters were installed on-site for examination</li> <li>✓ Recommendations to amend energy efficiency law to incorporate technical requirements for net metering submitted to the energy efficiency law committee for consideration/incorporation into draft EE law</li> </ul>

\* EE/RE = Energy Efficiency and Renewable Energy

### Implementation Constraints and Lessons Learned during this quarter:

- ▶▶ The third quarter of 2010 has witnessed two new bids, the anemometer (wind reader) bid was out and evaluation for a winner is under way, as is 1 PV project for a school in the South of Lebanon (Kfour) that does not have connection to a national grid. This bid induced a 25% price reduction for PV systems, from an average of 30,000 USD to 22,500 USD. This indicates that more sites will be selected in the next PV round to meet the budget spending requirements – a good indication.
- ▶▶ Roumieh Prison is appearing to be the most difficult project for CEDRO on every level, be it
  - (1) administrative where coordination with the internal security forces of Lebanon is proving complicated and there is a lack of coordination between the parties responsible for Roumieh,
  - (2) Access inside the prison is always difficult and dangerous,
  - (3) The shower rooms have been cancelled given that the prison was built to hold a capacity of 1000 inmates, yet it currently holds 3,700. Alternative connection of the SHW system to the inmates is being studied which will bring unavoidable delays and added costs.
- ▶▶ All the PV systems and the SHW systems being installed need to be revisited by the CEDRO team to ensure they are running correctly and that the maintenance team at the beneficiaries are doing their job. This issue came back up after several systems were not being well maintained. This issue is likely to get increasing attention from CEDRO to get a sustainable solution for it, a solution which will remain beyond the CEDRO Project's mandate.

#### IV. FUTURE WORK PLAN

Outputs and Activities	2010	2011	2012	2013
<b>1. Implementation of end-use EE/RE demonstration projects</b> <ul style="list-style-type: none"> <li>- Identification of beneficiary sites</li> <li>- Development of tender documents</li> <li>- Procurement of goods / services</li> <li>- Site Supervision and hand-over</li> <li>- Monitoring of system performance</li> </ul>	Implementation of 30 demonstration projects  Monitoring of installations	Implementation of 30 demonstration projects  Monitoring of installations	Implementation of 30 demonstration projects	Monitoring of installation  Termination of project
<b>2. Outreach and Technology transfer for the activation of EE/RE applications</b> <ul style="list-style-type: none"> <li>- Establishment of energy saving data base for public sector facilities</li> <li>- Development &amp; Implementation of capacity building &amp; awareness programs</li> <li>- Development of relevant EE/RE policies and procedures</li> <li>- Validation of project results</li> </ul>	Implementation of 2 technical workshops  Development of 70% of GIS database  Development of EE/RE procedures  Two media campaign for street lighting and PV projects to be carried out with high officials attending  Implementation of school awareness campaign on RE	Implementation of 3 technical workshops  Development of 100% of GIS database  Development of EE/RE procedures	Implementation of 2 technical workshops	Validation of project results
<b>3. Research and development for the formulation of a national EE/RE strategy and action plan</b> <ul style="list-style-type: none"> <li>- Assessment of national RE potential</li> <li>- Assessment of national EE potential</li> <li>- Identification of viable EE/RE actions</li> <li>- Identification of Implementation tools and funding mechanisms</li> </ul>	Completion of wind energy resource assessment  Launch of assessment of bioenergy potential  Launch of wind sector regulatory and legal framework  Assessment of net metering potential	Completion of other RE resource assessment  Identification of implementation mechanisms		Identification of national EE/RE strategy of Lebanon (putting together the studies initiated by CEDRO.



## CEDRO

### CEDRO 1

- ➔ Implementation of end-use energy efficiency and renewable energy applications for public sector buildings and facilities (50-60 sites in South, Bekaa and Akkar)

### CEDRO 2

- ➔ Implementation of end-use energy efficiency and renewable energy applications for public sector buildings and facilities (60sites across Lebanon)
- ➔ Technology transfer to enable the conversion of other public sector buildings and facilities into energy efficient modalities

### CEDRO 3

- ➔ Implementation of end-use energy efficiency and renewable energy applications for public sector buildings and facilities (60-80 sites across Lebanon)
- ➔ Technology transfer to enable the conversion of other public sector buildings and facilities into energy efficient modalities
- ➔ Research and development to enable the formulation of a national sustainable energy strategy and action plan

## V. ANNEX A – First list of Beneficiary sites

Region	Site	System	No. of beneficiaries
<b>Akkar (CEDRO 1)</b>	Rajem Issa public school	PV - 1800 Wp	345
	Mashta Hammoud public school	PV - 1800 Wp	322
	Kherbet Daoud public school	PV - 1800 Wp	85
	El Tleile public school	PV - 1800 Wp	122
	Hekr El Dahiri public school	PV - 1200 Wp	134
	Ouyoun El-Samak public school	PV - 1800 Wp	124
	Kroum Arab public school	PV - 1200 Wp	83
	Ain Yaakoub mixed public school	PV - 1800 Wp	160
	Habsheit public school	PV - 1200 Wp	85
	Meniara public school for girls	PV - 1800 Wp	303
	El-Hakoor mixed public school	PV - 1200 Wp	388
	Abdallah Rassi public hospital	SWH – 4000 Lit	57
<b>Bekaa (CEDRO 1)</b>	Baalbak first elementary public school	PV - 1200 Wp	178
	Chmestar community center	PV - 1800 Wp	18
	Hosh el Harime intermediate school	PV - 1800 Wp	385
	Jeb Jennine Municipality and Library	PV - 1800 Wp	-
	Mdoukha public school	PV - 1800 Wp	75
	Hosh El-Oumara community center	PV - 1800 Wp	21
	Aana Intermediate public school	PV - 1800 Wp	21
	Tell Zounoub Intermediate public school	PV - 1200 Wp	70
Hermel public hospital	SWH – 4000 Lit	26	
<b>South (CEDRO 1)</b>	Ayteet public school	PV - 1200 Wp	315
	Kherbet Selem first public school	PV - 1800 Wp	213
	Kfarkela first public school	PV - 1200 Wp	171
	Kfarshouba Intermediate public school	PV - 1800 Wp	150
	Houla municipality	PV - 1200 Wp	-
	Ain Ebel municipality	PV - 1200 Wp	-
	Saida public hospital	SWH – 6000 Lit	64
	Jezzine public hospital	SWH – 2000 Lit	20
<b>Mount Lebanon (CEDRO 1)</b>	Jbeil municipality	EE lighting	-
	Assia municipality	EE street lights	-
	Batroun municipality	EE street lights	-

PV: Photovoltaic system SWH: Solar Water Heating system

## Second list of Beneficiary sites

### Energy Efficiency

	Region	Facility Name
1	Beirut	Bassel Fleihan Institute
2	Beirut	VAT Building
3	Beirut	Council for Development and Research
4	Beirut	Lebanese University Faculty of Agriculture
5	Bekaa	Lebanese Agricultural Research Institute
6	Bekaa	Zahleh Municipality
7	Mount Lebanon	Hammana Municipality
8	Mount Lebanon	Banque Du Liban- Bekfaya
9	Beirut	Regie- Hadath
10	Beirut	Ministry of Social Affairs

### Solar hot water

	Region	Facility Name	Number of beneficiaries (People using hospitals)
1	Tripoli	Tripoli governmental hospital	150
2	Keserween	Keserween governmental hospital	100
3	Ehden	Ehden governmental hospital	12
4	Seblin	Seblin governmental hospital	100
5	Sir El Donniah	Sir El Donniah governmental hospital	45
6	Baalbeck	Baalbeck Army Institute	-
7	Roumieh	Roumieh Prison	-

### Street Lighting

	Region	Facility Name
1	Moukhtara	Moukhtara Street Lighting

### PV

	Region	Facility Name
1	South	Kfour public school