



PROGRESS REPORT

Reporting UN Organization	: United Nations Development Programme
Country	: Lebanon
Award ID	: 00047251
Award Title	: CEDRO – “Country energy efficiency and renewable energy demonstration project for the recovery of Lebanon”
Award Timeframe	: Oct 2007 – Oct 2013
Award Components	: CEDRO 1 – 00056604 CEDRO 2 – 00060150 CEDRO 3 – 00071261
Reporting Period	: 1 January 2011 – 31 March 2011

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:

CEDRO 1 2.73 million USD	<ul style="list-style-type: none"> ➔ 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)
CEDRO 2 3.50 million USD	<ul style="list-style-type: none"> ➔ Implementation of end-use energy efficiency and renewable energy applications for public sector buildings and facilities (app. 60 sites across Lebanon) ➔ Technology transfer to enable the conversion of other public sector buildings and facilities into energy efficient modalities
CEDRO 3 3.50 million USD	<ul style="list-style-type: none"> ➔ Implementation of end-use energy efficiency and renewable energy applications for public sector buildings and facilities (app. 60 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

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 (MoEW)
and Lebanese Center for Energy Conservation Project (LCEC)
✓ Ministry of Finance
✓ Council for Development and Reconstruction

1. Project Management

- Coordination and follow-up on a regular basis with the Technical Backstopping Agency, TTA, on all technical assessments for the selection of new sites, installation designs, supervision and monitoring of works;
- Preparation of regular progress reports and financial management of expenditures;
- Organization of stakeholder meetings (regular meetings with the Ministry of Energy and Water (MoEW) and with EDL) – leading to several projects to be implemented on wind energy integration, hydropower assessment, among others.
- Daily follow-up with site engineers and project staff;
- Providing technical and policy advice to decision-makers (MoEW) and UNDP CO on renewable energy issues, in particularly CEDRO played an important role in. Importantly, the concept of 'net metering' introduced and lobbied strongly by CEDRO, which is when the quantitative exchange of power between a renewable energy system and the national grid is allowed, has seen its way to a legally binding text sent from the MoEW to Electricity Du Liban (EDL). CEDRO is now assisting EDL to put the implementation vehicle of net metering and results of this should be out by Q2-Q3 of 2011.

2. Implementation of end-use energy efficiency and renewable energy demonstration projects for public sector buildings and facilities

Quarter 1 of 2011 has been focusing most of the efforts to get new projects out so that they can be completed this year, and working on executing projects already in the pipeline;

- The evaluation of the Light-emitting diode (LED) street lighting project for 8 new sites (see below) has been completed. The project is to be executed in Q2-Q3 of 2011. The 8 sites are located in;

Table 1. LED Street Lighting to be implemented in 2011

	Village name	Area
1	Ghalboun	Mount Lebanon
2	Kfour Aarbeh	Mount Lebanon
3	Saida	South
4	Shoueifat	Aley
5	Kfarnabrakh	Chouf
6	Jeb Jennine	Bekaa
7	Lala	Bekaa
8	Tell Znoub	Bekaa

A lighting protection system will need to be installed as well along-side all these street lighting fixtures given that the distribution network on the Lebanese grid is unprotected from lightning surges.

LED fixtures save 30-40% on the lighting load of municipalities, and live longer than normal lighting high-pressure sodium fixtures

- The ITB for 16 new PV sites has been launched late 2010, early 2011, and the awarded party has signed recently the contract to begin works. The new sites that will be implemented are

	Institution name	Area
1	Hammana Community Center	Mount Lebanon
2	Shiah Secondary Public School	Beirut
3	Kfarzabad Natural Reserve	Bekaa
4	El-Qaa Intermediate School	Bekaa
5	Bkesine Intermediate School	South
6	Kherbet Kanafar- Bekaa	Bekaa
7	El-Kalaa Community Center	Shouf
8	Shouf Technical School	Shouf
9	Khelwet Public School	Shouf
10	Ehmej Intermediate School	Mount Lebanon
11	Zouk Mosbeh Intermediate School	Mount Lebanon
12	Halat Intermediate School	Mount Lebanon
13	Kartaba Municipality	Mount Lebanon
14	Hrajel Municipality	Mount Lebanon
15	Jran Intermediate School	North
16	Kfarhelta Public School	North

PV will generate renewable electricity for the above institutions, benefiting them directly through removing the need for back-up generators with a few exception in winter, and lowering their EDL electricity bill.

- CEDRO is preparing a new list of approximately 20 PV sites to be implemented in 2011 as well. Most of the sites have been identified in Q1 of 2011 and the Invitation to bid (ITB) document is currently being prepared.
- A dimming street lighting project with Solidere in down-town Beirut is still being prepared and a local consultant on lighting and communication has been hired to assist in the writing of the ITB.
- Invitation to bid (ITB) for 4 new public hospitals has been prepared and forwarded to short-listed firms. Contract signature and implementation of work should begin in Q2 of 2011.

Kindly assess Annex 1 for a geographical representation of the projects of CEDRO in Lebanon.

3. Setting an enabling environment for the conversion of public sector buildings and facilities into energy efficient modalities

- Issuing of newspaper releases and magazine articles (national coverage);
- Networking and coordination with national project partners and stakeholders such as the Lebanese Order of Engineers, Ministry of Energy and Water, Ministry of Public Works, etc.,
- Synergy with the on-going UNDP project at the Ministry of Energy and Water, Lebanese Centre for Energy Conservation project (LCECP), on ongoing energy audits and activities to build on the project's technical know-how, experience on the ground, and lessons learnt during the implementation of energy efficiency and renewable energy activities. This entails exchange of technical data and lessons learnt as well as brainstorming session to coordinate and maximize efforts for project implementation;
- The CEDRO website (www.cedro-undp.org) is running and is being continuously updated with new events and projects as they happen.
- CEDRO has launched the 'national wind atlas for Lebanon' event under the auspices of the Minister of Energy and Water and Spanish Ambassador to Lebanon on the 25th of January, 2011. The event was a huge success despite the political situation at the time. Approximately 150 people attended the conference and where given a copy of the wind atlas with a CD. The feedback was very positive on the output of the wind atlas and issues on how to use the wind atlas and take things forward where also well argued – enabling new research from CEDRO to be prepared.



Wind atlas conference in Metropolitan Hotel, Beirut on 25th January, 2011

4. Assisting the establishment of a sustainable Energy Strategy for Lebanon

- The National Bioenergy assessment Study for Lebanon is underway. Again, bioenergy is a little understood yet highly important energy source that needs analysis in Lebanon. A study is underway to assess all the potential of various bioenergy sources in Lebanon,

assess conversion options, set scenarios of bioenergy uptake into future, all under very strict sustainability criteria and with a focus on barriers in Lebanon for bioenergy uptake.

- A study for energy from sewage sludge from wastewater treatment plants (WWTP) is currently being prepared by CEDRO. This study will focus in-depth on the current WWTP in Lebanon and the ability to generate energy from these sites, including the writing up of terms of reference of the bidding documents of sites identified with sufficient potential.
- Terms of reference for a study that assesses the implications of integrating wind into the national Lebanese grid has been prepared and will be posted online in Q2 of 2011. The study is important as wind is a variable source of energy; there is no production when wind speeds are below 4 m/s or above 25 m/s, and it is variable in-between. The implications of this variability on the grid and on conventional plants are a pre-requisite for wind integration in Lebanon.
- Terms of reference for a workshop for Environmental Impact Assessment (EIA) of Wind Farms are being prepared. EIAs are hoped to be pre-requisites for wind farm licensing in Lebanon, as done through the world. The workshop will be given by an international consultant experienced in wind farm EIAs for all interested local consultants and consultancies.
- CEDRO has asked for a proposal from the Central Administration for Statistics (CAS) to submit a proposal to conduct a comprehensive energy use survey for the domestic and commercial sectors in Lebanon. A proposal is due by the 21st of April, 2011.

All in all, CEDRO aims to assist the government in Lebanon in deciding which energy source to utilize to reach its objective of 12% of its electricity mix to come from renewable energy sources by 2020 – an objective approved by the Council of Ministers and asserted in the Copenhagen Summit¹.

II. RESOURCES

		CEDRO 1	CEDRO 2	CEDRO 3
Total budget approved	:	USD 2,732,240	USD 3,500,000	USD 3,500,000
Total disbursements as for 31 Mar 2011	:	USD 2,723,240	USD 1,455,046	USD 179,271
Available Balance	:	USD 0	USD 2,044,953	USD 3,320,729
Commitments for next quarter	:	N/A	USD 250,000	USD 100,000

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)
1. Personnel (Incl. staff and consultants)	177,000	206,000	220,000	278,887	214,000	0
2. Contracts (Incl. companies, professional services)	220,000	238,004	440,000	79,497	835,700	165,644
3. Training (incl. AV printing / production)	22,000	16,142	40,000	27,287	50,000	0
4. Transport (local)	30,000	38,800	10,000	2,472	25,000	0
5. Supplies and commodities (Incl. IT equip and rental & maintenance)	36,300	50,387	50,000	34,000	70,000	0
6. Equipment (including installation)	2,030,000	1,986,222	2,450,000	926,713	2,111,500	0
7. Travel	14,000	6,055	15,000	4,000	25,000	1,899

8. Miscellaneous	11,683	11,885	30,000	7,000	21,000	0
9. Agency Management Support (7%)	191,257	178,745	245,000	95,190	147,805	11,728
TOTAL	2,732,240	2,732,240	3,500,000	1,455,046	3,500,000	179,271

CEDRO Project	CEDRO 1 2.73 million USD	CEDRO 2 3.50 million USD	CEDRO 3 3.50 million USD
Activity Results	Indicators		
1 - Implementation of end-use energy efficiency and renewable energy demonstration projects for public sector buildings and facilities	<ul style="list-style-type: none"> ➔ Identification and Implementation of 50-60 EE/RE demonstration projects in South, Bekaa and Akkar 	<ul style="list-style-type: none"> ➔ Identification and Implementation of 60-80 EE/RE demonstration projects the remaining regions of Lebanon 	<ul style="list-style-type: none"> ➔ Identification and Implementation of 60-80 EE/RE demonstration projects across Lebanon
2 – Outreach and technology transfer to enable the conversion of other public sector buildings and facilities into energy efficient modalities	<ul style="list-style-type: none"> ➔ Development and implementation of technical workshops and awareness tools 	<ul style="list-style-type: none"> ➔ Development and implementation of technical workshops and awareness tools ➔ Development of GIS energy data base and EE/RE procurement specs 	<ul style="list-style-type: none"> ➔ Development and implementation of technical workshops and awareness tools ➔ Development of GIS energy data base and EE/RE procurement specs ➔ Validation of project results and development of replication schemes
3 – Research and development to enable the formulation of a national sustainable energy strategy and action plan	-	-	<ul style="list-style-type: none"> ➔ Assessment of national renewable energy resources ➔ Assessment of national energy efficiency potential ➔ Development of national EE/RE strategy & action plan

Progress in Project Implementation:

Activity Results	Activity Actions	Targets for 2011	Status for 2011
1 – Project Management	1.1 Technical Management	✓ Organization of 3 conferences and/or events and end of year project board meeting	✓ 1 conference (wind atlas) has occurred
	1.2 Financial Management	✓ Organization of 3 international backstopping missions;	✓ 1 backstopping mission has occurred
	1.3 Operational Management	✓ Issue a report on the status and results of the CEDRO 1 pilot projects that were already implemented	✓ Pending auditing of CEDRO 1 task
		✓ Provide advisory support services on EE/RE policies and legislations	✓ Advisory services for MoEW and EDL on net metering on-going
		✓ Attendance of capacity building workshops for CEDRO team	✓ Two CEDRO engineers are going to China in Q2 of 2011 to be trained on PV systems from the world leader, Suntech ✓ Preparation for attending workshop on life-cycle assessment, graphic design, and other related issues to CEDRO will be done in Q2-Q4 2011.
	✓ Preparation of regular progress reports;	✓ Q1 progress report prepared	
Activity Results	Activity Actions	Targets for 2011	Status for 2011
2 - Implementation of end-use energy efficiency and renewable energy demonstration projects for public sector buildings and facilities	2.1 Undertake targeted assessment and identification of project beneficiary sites;	✓ Implementation of 50 demonstration projects; ✓ 16 PV projects to begin and finish in 2011 ✓ 20 PV projects to begin in 2011 (finish 2012) ✓ 4 new SHW hospitals to begin and finish in 2011 ✓ 1 Ground source heat pumps (GSHP) to begin and finish in 2011	✓ Contract for 16 PV sites awarded to local contractor ✓ TORs for 20 new PV sites being prepared ✓ TORs for 4 SHW sites being prepared ✓ TOR for GSHP project being prepared ✓ TOR for dimming street lighting project being prepared
	2.2 Develop tender documents and undertake bidding & procurement of goods/services;	✓ 8 sites for LED street lighting across Lebanon ✓ 1 street lighting project with Solidere (dimming) ✓ Launch 10 sites for micro-wind	✓ Evaluation of LED street lighting proposals under way ✓ Works in Baalbeck continuing with final touches ✓ Works on Roumieh on-going yet slow due to circumstances at the prison
	2.3 Undertake commissioning of works and supervision and monitoring of sites;	✓ Complete work on Baalbeck Army Institute ✓ Complete work on Roumieh Prison ✓ Undertaking third EOI for RE/EE suppliers end of 2011 ✓ Continuous cooperation between CEDRO, the MoEW and the LCEC for on-going projects	✓ No work on micro-wind sites can begin before the wind speed data project which is on-going is completed. Data from this latter project is a pre-requisite for launching ITB for micro-wind.

	2.4 Undertake testing of performance & data collection;		
Activity Results	Activity Actions	Targets for 2011	Status for 2011
3 – Outreach and technology transfer to enable the conversion of other public sector buildings and facilities into energy efficient modalities	3.1 Develop and implement technical workshops and awareness activities;	<ul style="list-style-type: none"> ✓ Development and implementation of 2 technical workshops 	<ul style="list-style-type: none"> ✓ Micro-wind wind-speed anemometer workshop for specialists will be prepared in Q2-Q3 of 2011 ✓ Other workshop on GSHP would be prepared if ready in 2011, otherwise in 2012.
	3.2 Develop GIS energy data base and EE/RE procurement specs;	<ul style="list-style-type: none"> ✓ Continuation and expansion of CEDRO outreach and visibility; ✓ 2 newsletters to be produced in 2011 ✓ Documentary on CEDRO in english and arabic to be prepared 	<ul style="list-style-type: none"> ✓ Updating project website: www.cedro-undp.org (En/Ar); ✓ Article on CEDRO in (1) Beyond magazine ✓ Full press coverage for the wind atlas event in all local newspapers and magazines ✓ Documentary has been prepared for CEDRO.
	3.3 Validate project results and enable replication schemes;	<ul style="list-style-type: none"> ✓ Set-up of GIS database for 200 public sector sites; 	<ul style="list-style-type: none"> ✓ Set-up of GIS database for 109 public sector sites completed;
4 – Research and development to enable the formulation of a national sustainable energy strategy and action plan	<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 & action plan;</p>	<ul style="list-style-type: none"> ✓ Complete Wind ATLAS for Lebanon and disseminate results ✓ Complete study and disseminate results of the national bioenergy assessment of Lebanon ✓ Completion of a microwind potential assessmet in 10 different sites ✓ Launch study on energy from wastewater treatment plants (WWTP), including specificaiton documents ✓ Launch study on wind power integration into the grid ✓ Launch study on small to micro-hydro power ✓ Hire international consultant to study hydro-power plants rehabilitation in Lebanon and specification documents ✓ Work on the TOR for the energy use survery for the domestic and commercial sectors in Lebanon. 	<ul style="list-style-type: none"> ✓ Wind atlas completed and disseminated in a conference on January 2011. ✓ Bioenergy study ongoing, only 1 Task remaining ✓ Microwind potential assessment project on-going ✓ TOR for WWTP study prepared ✓ TOR for wind power integration prepared ✓ TOR for small to micro-hydro being prepared ✓ TOR for international hydro-power consultant being prepared ✓ Request for proposal from the Lebanese Central Administration for Statistics (CAS) sent out to CAS and awaiting response in Q2 2011 from CAS.

* EE/RE = Energy Efficiency and Renewable Energy

Implementation Constraints and Lessons Learned during this quarter:

- ▶▶ In this last quarter of 2011, CEDRO has experienced the following:
 - In Roumieh Prison, work has been significantly delayed due (1) to the Internal Security Forces (ISF) and the Ministry of Interior and Municipalities not signing the Memorandum of Understanding (MOU) with CEDRO, (2) due to many events that have occurred in Roumieh like prisoners escaping and riots, and (3) due to difficult working conditions and limited working hours allowed. CEDRO-UNDP is working hard to resolve the issue and continue works to deliver hot water to the prisoners
 - The national electricity distribution grid in Lebanon is unprotected from lightning strike surges, as opposed to international practice. This has burned several PV inverters before, and has also burned LED street lighting fixtures. Now CEDRO is re-assessing all its work done to ensure proper lightning protection from the grid (direct lightning strikes have been protected originally, yet voltage surges coming from the grid where not, as they are the responsibility of EDL). Any future work of CEDRO must also cater for this problem. This is will increase slightly the costs of RE installations.

IV. FUTURE WORK PLAN

Outputs and Activities	2011			
	Q1	Q2	Q3	Q4
1. Implementation of end-use EE/RE demonstration projects <ul style="list-style-type: none"> - Identification of beneficiary sites - Development of tender documents - Procurement of goods / services - Site Supervision and hand-over - Monitoring of system performance 	Preparing for the implementation of 50 demonstration projects Monitoring of past installations	Procurement and Implementation of 30 demonstration projects Monitoring of implementation Monitoring of past installations	Procurement and Implementation of 20 demonstration projects Monitoring of implementation	Monitoring of implementation Monitoring of past installations Set program for 2012
2. Outreach and Technology transfer for the activation of EE/RE applications <ul style="list-style-type: none"> - Establishment of energy saving data base for public sector facilities - Development & Implementation of capacity building & awareness programs - Development of relevant EE/RE policies and procedures - Validation of project results 	Implementation of 1 conference Development of EE/RE procedures	Implementation of 1 awareness campaigns	Implementation of 1 technical workshop Implementation of 2 opening events Validation of project results	Development of 75% of GIS database Set program for 2012
3. Research and development for the formulation of a national EE/RE strategy and action plan <ul style="list-style-type: none"> - Assessment of national RE potential - Assessment of national EE potential - Identification of viable EE/RE actions - Identification of Implementation tools and funding mechanisms 	Completion of other RE resource assessment and technical requirements Identification of implementation mechanisms	RE and EE studies to continue, catering for the needs of the sector	RE and EE studies to continue, catering for the needs of the sector	Set program for 2012

Outputs and Activities	2012			
	Q1	Q2	Q3	Q4
1. Implementation of end-use EE/RE demonstration projects <ul style="list-style-type: none"> - Identification of beneficiary sites - Development of tender documents - Procurement of goods / services - Site Supervision and hand-over - Monitoring of system performance 	Preparing for the implementation of 30 larger scale demonstration projects Monitoring of past installations	Preparing for the implementation of 10 demonstration projects Monitoring of implementation Monitoring of past installations	Monitoring of implementation Lay the ground-works for maintenance of systems post CEDRO	Monitoring of implementation Monitoring of past installations Set program for 2013
2. Outreach and Technology transfer for the activation of EE/RE applications <ul style="list-style-type: none"> - Establishment of energy saving data base for public sector facilities - Development & Implementation of capacity building & awareness programs - Development of relevant EE/RE policies and procedures - Validation of project results 	Implementation of 2 conferences	Implementation of 2 awareness campaigns	Implementation of 2 technical workshop Implementation of 2 opening events Validation of project results	Development of 90% of GIS database Set program for 2013
3. Research and development for the formulation of a national EE/RE strategy and action plan <ul style="list-style-type: none"> - Assessment of national RE potential - Assessment of national EE potential - Identification of viable EE/RE actions - Identification of Implementation tools and funding mechanisms 	Completion of other RE resource assessment and technical requirements	RE and EE studies to continue, catering for the needs of the sector	RE and EE studies to continue, catering for the needs of the sector	Set program for 2013 Putting together the studies initiated by CEDRO.

Outputs and Activities	2013			
	Q1	Q2	Q3	Q4
1. Implementation of end-use EE/RE demonstration projects <ul style="list-style-type: none"> - Identification of beneficiary sites - Development of tender documents - Procurement of goods / services - Site Supervision and hand-over - Monitoring of system performance 	Monitoring of past installations	Monitoring of past installations	Monitoring of past installations	Issuance of technical reports on different technologies
2. Outreach and Technology transfer for the activation of EE/RE applications <ul style="list-style-type: none"> - Establishment of energy saving data base for public sector facilities - Development & Implementation of capacity building & awareness programs - Development of relevant EE/RE policies and procedures - Validation of project results 	Implementation of 2 conferences	Implementation of 2 awareness campaigns Development of 100% of GIS database	Implementation of 2 technical workshop Closing ceremony of CEDRO	Issuance of reports on policies and awareness campaigns implemented -
3. Research and development for the formulation of a national EE/RE strategy and action plan <ul style="list-style-type: none"> - Assessment of national RE potential - Assessment of national EE potential - Identification of viable EE/RE actions - Identification of Implementation tools and funding mechanisms 	Complete ongoing studies	Complete ongoing studies	Putting together the studies initiated by CEDRO and disseminating in closing ceremony of CEDRO	Drafting the renewable energy and energy efficiency strategy for Lebanon

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

Annex 1. Map of CEDRO's installations

Distribution MAP of CEDRO's installation

