IMPACT SERIES

EXPANDING SUSTAINABLE ENERGY IN LEBANON

UNDP 50 YEARS

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Supporting Progress
On Sustainable Development Goals, including;

1 NO POVERTY
7 AFFORDABLE AND CLEAN ENERGY
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
SUSTAINABLE DEVELOPMENT GOALS

In an effort to expand energy access and fight climate change, UNDP is working with the Government of Lebanon, the European Union, and the private sector on a national sustainable energy strategy.

OVERVIEW

Energy is critical to the achievement of the Sustainable Development Goals. **SDG7** on Sustainable Energy explicitly pushes for concerted efforts to switch to clean, renewable and affordable energy sources, while the need for energy access permeates the entirety of the SDGs, spanning poverty, education and healthcare.

To support Lebanon in achieving the SDGs, as well as make progress against national climate commitments, UNDP, together with the European Union, Government of Lebanon, and members of the private sector, are supporting the **CEDRO 4** project, which aims to support energy access, efficiency and sustainability.

Working with the Ministry of Energy and Water, the Lebanese Center for Energy Conservation, the Council for Development and Reconstruction, Electricite du Liban (EDL), and the Ministry of Industry, the **CEDRO 4** project works to both pilot new initiatives and scale up tried and effective approaches.

SPECIFICALLY CEDRO AIMS TO:

- Lower public and private financial burdens related to energy expenditure;
- Assist in scaling up renewable energy use to 12 percent of the national energy mix by 2020;
- Assist in increasing energy efficiency by 5 percent;
- Promote small-scale renewable energy sources; and
- Enhance the drive towards a green economy.

In achieving these objectives, CEDRO focuses on five key actions:

1. implementing renewable energy and energy efficiency applications for the commercial and industrial sectors;
2. putting in place a bioenergy application (for heating) from forestry residues;
3. implementing a low-carbon village;
4. providing renewable energy policy support, planning and analysis for the Government; and
5. supporting capacity building, awareness-raising, and marketing for sustainable energy initiatives.

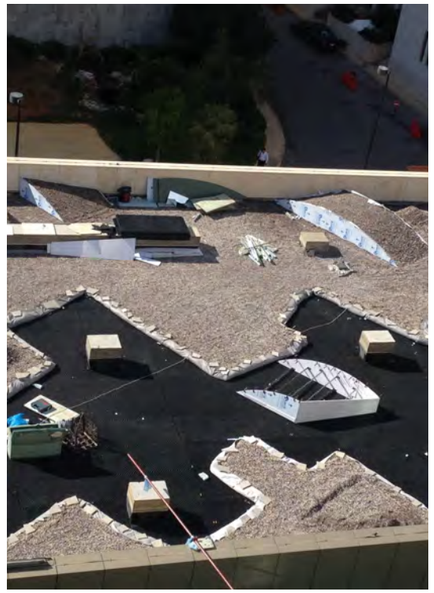
With the onset of the Syrian Refugee Crisis in Lebanon, the programme extended its mandate to include the integration of small renewable energy systems for vulnerable host-communities in the rural areas of Akkar and the Bekaa.

IMPACTS OF CEDRO 1-3

The first three phases of the CEDRO project (2007-2013), funded by the Spanish Government via the Lebanon Recovery Fund, supported more than 100 renewable energy applications, including photovoltaic (PV) and micro wind systems, large-scale solar hot water, and ground source heat pump projects. The project also supported a wind atlas, a bioenergy strategy, a geothermal power assessment, and a hydro power study from non-river sources.

Results Include:

- Piloting renewable street lighting in several cities. This helps prevent crime and protect residents, especially women and girls;
- Implementing the first hydroponic green roof on one of the main buildings of the Central Bank of Lebanon's Hamra branch. The green roof is providing additional insulation and helping to regulate air conditioning, while reducing associated costs and lowering carbon emissions; and
- Piloting a pico-hydro system to power a public school in Ramliyeh. A 10 kW turbine was installed with battery storage, enabling the school to operate with out diesel generators.



CEDRO 4

Renewable energy and energy efficiency for the private sector

Together with a European Neighborhood and Partnership Instrument project entitled MEDSOLAR, CEDRO is implementing nine power generation schemes that combine solar energy on the national grid with existing diesel and battery storage. The capacity of each of the nine sites ranges from 130 kWp to 300 kWp, with a total of 1.44 MW of power to be installed. The outcome of this stream is devoted to increased energy access and reliable power supply, while also a reduction in fossil fuel based energy requirements and support to the local solar market. **The nine projects are projected to be completed by the end of 2016.**

In addition to working with local, community-based organizations, **CEDRO 4** is also helping improve energy efficiency among Lebanese companies, helping them to decrease emissions and increase profitability. One large partner and beneficiary is LibanJus, a juice manufacturer in Baabda.

"For LibanJus to meet its production target, we had to invest in a large diesel plant," says Nadim Gharios, business development manager. The company has been using diesel generators to ensure continuous electricity, a measure that increased production costs and raised the selling price of its product." [The] "electricity cost in Lebanon is higher than most other countries, something that directly impacts our competitiveness in the regional markets," Nadim continues.

A hybrid power system has been installed in LibanJus, which will reduce energy costs and make the company more competitive. The 429-panel system will generate 356 MWh of electricity and save approximately 275,210 kg in CO2 emissions annually. Similar systems are being implemented in other Lebanese companies in Bekaa and Bikfaya, as well as in two universities in Kaslik and Beirut.

A second project is being undertaken at the MEDRAR Medical Center (MMC) in the Caza of Nabatye. The health facility provides support for drug addiction and care to the elderly. The project is putting in place a geothermal energy system that includes 180 vertical boreholes of 100 meters each. The capacity of each of the installed heat pumps will be 1.08 MW, and will help to heat, cool, and deliver hot water to the 240-bed facility, supporting at least 25,000 people per year.

Bioenergy from Forest Residue (for heating)

Making use of forest residues, the CEDRO 4 project is using biomass from the Bkessine Pine Forest to produce briquettes, which are in turn used to heat over 300 homes. The decision to begin work in Bkessine was based on careful analysis and inventory, and a forest management plan has been put in place to ensure sustainable use. An additional forest in the village of Aandket, Akkar, has also been selected due to additional funds received in support of host communities supporting Syrian refugees.

Through the bioenergy initiative, **approximately 3000 people in these two regions will benefit from sustainable briquettes**. Not only will these people directly benefit from the briquettes, which will replace diesel for heating and

minimize illegal tree cutting, the process reduces the risk of forest fires, generates income, and limits the time that people, especially women and girls, have to expend searching for firewood. ***Amongst others, this initiative supports SDGs 5, 7 and 15 on gender equality, affordable energy and better land use.***

Low Carbon Village

The village of Kabrikha in the South of Lebanon has been selected as a model low-carbon village. The project is supporting community-led solar power that includes a 250 kWp PV system benefiting 450 rural households or approximately 2250 residents. An innovative approach, the PV system will be synchronized with the village's central diesel system and will automatically connect and synchronize when national electricity is available. ***In addition to limiting carbon emissions, this supports SDGs 1 & 7, encouraging efforts to eradicate poverty and ensure access to clean and affordable energy.***

Renewable Energy Policy Support

Another objective of CEDRO 4 is to support the Government in reaching the 12 percent energy mix target by 2020 and the 5 percent energy efficiency reduction target. To support this, UNDP and partners are investigating alternative methods, including:

Hydropower: The UNDP CEDRO project, in collaboration with the Ministry of Energy and Water, published a study on Hydropower Potential from Non-River Sources in Lebanon. The study identified about 3.4MW of energy that can be generated along the coastline of Lebanon from the water dumped back into the Mediterranean.

Waste: A study published by the UNDP CEDRO project, in collaboration with the Ministry of Energy and Water, investigated the wastewater potential for energy generation. Five waste water treatment plants were identified. The combined electrical power of the plants totals up to: 5.9MW. It also shows that the addition of sludge from nearby plants increases the potential to 11.6MW.

Support to the Syrian Refugee Crisis

In partnership with several donors including the Government of Germany, The Netherlands and the Kingdom of Saudi Arabia through the UNHCR, UNDP is supporting Government with the current refugee crisis. The CEDRO programme is implementing several projects that directly assist host-communities by providing residents with access to sustainable energy sources for heating and lighting.

Small photovoltaic lighting kits that provide electricity to power three rooms and a mobile phone charger per household have been distributed in remote villages. Some 750 households or the equivalent of 3,500 individuals have benefited from this technology

Support to achieve Sustainable Development Goals

Support for energy initiatives, such as **CEDRO 4**, broadly supports sustainable development and the SDGs. This includes, but is not limited to:

SD Goal 1
End poverty in all its forms everywhere

SD Goal 5
Achieve gender equality and empower all women and girls

SD Goal 7
Ensure access to affordable, reliable, sustainable and modern energy for all

SD Goal 10
Reduce inequality within and among countries

SD Goal 12
Ensure sustainable consumption and production patterns

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