ENERGY
SECTOR

PEOPLE IN NEED
2,035,461

PEOPLE TARGETED
678,487

REQUIREMENTS(US$)
2020 99.2 million

PARTNERS
10

GENDER MARKER
2a

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SECTOR OUTCOMES

Outcome #1
$39.1 m

Increase energy production through implementation of renewable energy sources.

Indicators
Amount of MWh produces through new renewable energy sources.

Outcome #2
$7.5 m

Reduce energy demand due to implementation of energy efficient initiatives.

Indicators
Reduction resulting from installed capacity through energy efficient measures in MWh.

Outcome #3
$51.6 m

Improve access to electricity through Rehabilitation and Reinforcement works on the Transmission and Distribution networks.

Indicators
Number of people benefiting from rehabilitation and reinforcement works on the transmission and Distribution networks.

Outcome #4
$1 m

Enhance capacity of MoEW to plan, budget and oversee energy sector initiatives.

Indicators
Number of new energy initiatives and projects resulting from capacity development and support to MoEW.

POPULATION BREAKDOWN

POPULATION COHORT	PEOPLE IN NEED	PEOPLE TARGETED	51% Female	49% Male
Lebanese	1,219,094	406,365	207,246	199,119
Displaced Syrians	816,367	272,122	138,782	133,340

Overall sector strategy

The theory of change for the Energy sector towards the sector's overall objectives are as follows:

If:

- The Energy sector increases the capacity of electricity generation through the installation of renewable energy systems (Outcome 1) or decreases the demand for electricity through the provision of energy efficient products (Outcome 2); and
- Support of the rehabilitation or reinforcement of the electricity network is realized (Outcome 3); and
- Enhances the capacity of implementing partners, such as the Ministry of Electricity and Water and other actors occurs (Outcome 4);

Then: The sector can partially and locally reduce the supply/demand gap exacerbated by the displaced population and increase the network's capacity to deliver non-fluctuated/intermittent electricity access to the most vulnerable in an environmentally friendly manner, reducing the reliance on diesel generators and air pollution caused by it.

The overarching objective of the Energy sector in Lebanon is to improve access to electricity at agreed minimum standards to households affected by the Syria crisis, and across sectors providing vital services. It aspires to provide electrical services to Lebanese host communities and persons displaced from Syria equitably, with consideration to its potential negative impact on the environment and limiting the financial impact on the Lebanese Government and consumers.

The overall objective of the Energy sector is: "By the end of 2020, all vulnerable populations in Lebanon will have improved and equitable, sustainable access to electricity services."

By enhancing electricity services and capacity at the national and local level in a sustainable manner, the Energy sector contributes to the LCRP`s third objective of supporting service provision through national systems, and the fourth objective of reinforcing Lebanon`s economic, social, and environmental stability.

Before the outbreak of the Syria crisis, the Ministry of Energy and Water had been improving Lebanon's electricity infrastructure, guided by the Policy Paper for the Electricity Sector (Ministry of Energy and Water, 2010), which was updated in 2019[i], and the other national action plans for renewable energy[ii] and energy efficiency[iii]. The strategy for the Energy sector is built on these national strategies, while also considering various vulnerability assessments to understand and identify where the most urgent and critical needs exist.

While the Ministry of Energy and Water continues to implement its Policy Paper for the Energy Sector, a number of short and medium-term projects will be selected and accelerated in order to directly target the impact of the Syria crisis on the sector. The proposed interventions can be summarized as follows:

- Capital investment in decentralized energy generation capacity (Outcome 1), energy efficiency measures (Outcome 2) and associated transmission and distribution networks (Outcome 3) to partially meet the additional demand created by the displaced Syrians while also supporting vulnerable communities and public institutions by improving access, availability and affordability of electricity, and;
- Supporting the implementation of the government's development plans for the Energy sector through increased institutional capacity and technical assistance (Outcome 4).

All vital services in Lebanon depend on the provision of electricity. Therefore, by improving the overstretched condition of the Energy sector, the sector's interventions can also contribute to achieving outcomes identified by the other sectors. The identified cross-sector contributions are as follows:

Education (out-of-school children): To host persons displaced from Syria, many public schools are now providing second shifts, which strain the operational capacity of the schools. The implementation of energy efficiency and renewable energy measures are a cost-effective way to reduce the electricity bills at schools. The Education sector and the Energy sector, under the guidance of MEHE will implement Renewable Energy projects mainly distribution of Solar PV systems and installation of energy efficient (LED Lighting) projects in public schools. The installation of solar PV in schools can generate monetary savings throughout its lifespan (c.a. 20 years) and the financial savings from reducing electricity bills can be re-directed to core education activities such as school enrolment.

Local economic development: Even though the proposed activities in the Energy sector's response plan essentially target the public sector, the technical capacity in this sector, together with the increasing private investment in renewable energy and energy efficiency (including green building) projects stimulated by the green finance mechanisms (such as the EBRD GEFF and the EU/EIB/AFD LEEREFF), could provide cross-cutting opportunities for job creation. In fact, a UNDP study has shown that investment in solar PV systems creates various local "direct" and "indirect" jobs in Lebanon[iv]. Direct jobs include construction work, the design of the solar PV system, and other business activities such as financing, admission, legal services, consultation and planning. In addition, along the solar PV value chain, the demand for wiring, cabling, legal services etc. creates indirect jobs in the respective economic sectors. It is estimated that each US$1 million investment for 1 MW of solar PV installation creates at least 11 direct jobs (Full-Time Employment equivalent, FTE) and 20-25 indirect ones, amounting to 30-45 FTE jobs along the value chain. This indicates that further acceleration of investment in the installation of solar PV will expand job-demand/requirements in the sector.

Environment and tension mitigation: Renewable energy sources, use of energy-efficient products, and connections to the grid are the best examples on how the sector would help in reducing the impact of the Syria crisis on air quality in Lebanon through reducing the use of diesel generators. Solar street lighting around public spaces (e.g. municipal roads) will enhance security within the communities and contribute to the protection of vulnerable populations and increased social stability between host communities and displaced Syrians. Installation of solar street lighting or replacement with LED lighting would be considered for this purpose. To improve the quality of electricity supply at the municipality-level, the installation of transformers could be an effective intervention. The Ministry of Energy and Water has been undertaking the reinforcement of the distribution network, operated and maintained by Electricité du Liban (EDL), by prioritizing the sites based on both local needs and technical assessments. In 2020, the sector will work with the Social Stability sector to explore ways to mitigate the impact of potential tensions caused by the perceived impact of the Syria crisis on the use of already limited electricity resources.

LCRP impact, sector outcomes, outputs and indicators

Outcome 1 - Increase energy production

This outcome seeks to increase the capacity of electricity supply to reduce the expanded gaps due to the presence of displaced populations through the installation of distributed renewable energy systems in vulnerable host communities and public institutions that are under severe financial pressure to meet the increase in demand brought about by the Syria crisis. As demonstrated in the sector's achievements, the installation of renewable energy systems has sustainable and long-lasting direct impacts on vulnerable communities and public institutions through monetary savings. Also, given its positive net-present-value, the renewable energy project can also catalyze private finance, multiplying the impact of the grant support.

For community-scale support, the initiative: "Village 24 Initiative", developed by UNDP-CEDRO with the European Union fund, based on the experience of the first community-led solar photovoltaic systems in Kabrikha, could be of great potential[v]. Although it is still at pilot stage (as of October 2019), this community-scale hybrid microgrid (utility, diesel generator, renewable energy) can provide clean and affordable electricity to multiple households by utilizing the digitization of net-metering scheme while also promoting community cooperation. A community-scale solar photovoltaic system can lower the investment cost (economies of scale), potentially enabling the communities to tap into private finances such as soft-loans, microfinancing as well as crowdfunding.

Output 1.1- Renewable energy systems implemented

Given these comparative advantages of renewable energy projects, Lebanon's current market and legal situation and completed technical studies, the installation of the following cost-effective renewable energy systems can be considered as sustainable measures that would remain as renewable energy sources for the country beyond the current crisis:

- Solar Water Heaters (SWH): Solar water heaters are a highly cost-effective way (good turnover) to reduce electricity consumption from heating water. While most Lebanese households still use electricity to heat water and pay expensive bills, the capacity of local manufacturing and deployment of solar water heaters is already well-established
- Solar off-grid lighting
- Solar pumping for public wells
- Distributed renewable energy power generation: The Energy sector strongly recommends the installation of renewable energy systems, such as solar photovoltaic systems, biomass energy and ground source heat pumps to serve communities and public institutions. As Lebanon has numerous renewable energy resources including affluent solar irradiation, wind and biomass but it currently generates most of the electricity from imported oil with massive deficit, the promotion of renewable energy has multi-fold benefits such as cash fluidity/circulation within the community, multiplier effects on the national economy and job creation as described above.

Outcome 2 - Reduce energy demand due to implementation of energy efficient initiatives

While Outcome 1 targets the upstream/supply side of electricity provision, Outcome 2 targets the downstream, demand-management side of the sector. Through the activities under this Outcome, energy efficiency measures will be deployed with the aim of reducing energy consumption in Lebanese communities, shelters for displaced Syrians, schools, healthcare centres, hospitals and social development centres. In these locations, electricity is primarily used for heating, domestic-water heating, lighting, and cooking (mainly in residential facilities).

Output 2.1 - Energy efficient products provided to households and public institutions

Based on the type of shelter/facility and the same population assumptions as in Outcome 1, the following energy efficiency activities can be considered:

- Light-emitting diode (LED) lighting and solar cookers in households
- LED lighting and lighting control in public schools
- Energy audits in hospitals and implementation of measures
- Walk-in energy audits in primary and secondary

health centers, social development centers and implementation of measures

- Energy saving measure in the Agriculture sector – Variable Speed Drives (VSD) for Water Pumps

Outcome 3 - Improve access to electricity through rehabilitation and reinforcement works on the transmission and distribution networks

This outcome is divided into two Outputs, one related to work on the transmission network, and the other to the distribution network, as described hereafter.

Output 3.1 - Transmission network reinforced through the installation of high and medium voltage transformers

The transmission network serves to transmit the energy produced by the generation sites to the distribution networks through Overhead Transmission Lines (OHTL), High Voltage Substations (SS), and Underground High Voltage Cables (UGC). Substations of the transmission network reduce the high voltage from power plants to medium voltage. The crisis has had a direct impact on the transmission sector, because it has led to overloading the high voltage substations and transmission lines. This is forcing many large consumers, like hospitals and industries, to rely on private generators – not only because of power shedding, but also because of the significant drop in voltage due to additional loads carried substations. Therefore, the transmission network can be upgraded or completely reconstructed, depending on the available space as part of the LCRP interventions in close coordination with MoEW and EDL.

Output 3.2 - Distribution network reinforced through the installation of medium and low voltage transformers

Overloading of the distribution network due to increased demand especially in localities hosting large numbers of displaced Syrians causes a decline in the quality of electricity supply to households and increases the risk of fire and damage in overburdened transformers. Thus, the reinforcement of the distribution network is one of the key interventions aiming to increase the capacity to deliver quality electricity to additional end-users, especially to the most vulnerable people and communities. If this proposed work on the distribution network is implemented, Lebanese host communities and displaced Syrians would feel an improvement in the quality of the electric current supplied and an increase in the number of hours electricity is available, decreasing their reliance on private generators and thereby electricity cost. The intervention would also include the prevention of illegal connections to the grids as a means to reduce technical losses through the distribution system and appropriately recover the cost of electricity generation.

Outcome 4 - Ministry of Energy and Water staff specialized in different areas of the Energy sector provided

The Energy Sector Policy Paper is being implemented by a group of specialized experts and consultants under the employment of the Ministry, who have become overburdened in responding to the impact of the Syria crisis. Therefore, to implement and manage the activities proposed in this strategy, a dedicated team of experts and consultants is required to provide necessary support, due diligence, and supervision. The international community is requested to provide immediate support to ensure sufficient institutional capacity to oversee implementation and completion of the above-mentioned projects and the short-term improvement interventions in electricity supply.

Identification of sector needs and targets at the individual/HH, community and institutional/physical environment level;[1]

For displaced Syrians, their needs depend on their type of settlement:

- Informal settlements (non-permanent shelters): Are typically located in agricultural areas. They require comprehensive assistance in basic services, especially electricity, to provide them with basic household lighting, cooking appliances, and hot water for bathing and other uses. Provision of street lighting in informal settlements is also a major benefit to the security of displaced Syrians, as well as Lebanese host communities, and reduces social tensions between both populations. However, it should be noted that the policy of the Government of Lebanon is that no permanent infrastructure should be installed in informal settlements.
- Host communities (residential and non-residential): Typically found in densely-populated urban centres, particularly in already impoverished neighbourhoods and in informally developed urban areas, where access to essential electricity is insufficient. Lebanese and displaced Syrians living in substandard shelters require improved electricity services, ensuring sufficient access for all.

As for the Palestinian refugees from Lebanon and Palestinian refugees from Syria living in camps in Lebanon, the Ministry of Energy and Education and Electricité du Liban have pending claims with UNRWA extending from 2003 until 2018, which is currently further extended. These claims are currently being handled by the Ministry of Foreign Affairs. As such, the Ministry of Energy and Water is in no position to take into account the demand of these populations within the LCRP. If solutions are reached within the 2018 and 2020 period, the Energy sector strategy under the LCRP will be revisited accordingly.

(1) This can include Governorates, Districts, Cadasters, villages etc.

The sector's response targets the needs of the most vulnerable first, using the following criteria to prioritize activities and projects:

- Focus on geographical areas with the highest concentration of affected people and with no/poor access to sufficient quantity, quality, and continuity of services related to electricity;
- Implement pre-planned priority projects that are part of the Government of Lebanon's strategies and masterplans, which ensure vital service provision to the most vulnerable communities in a sustainable manner;
- Focus on the highest risks of environmental degradation in areas with the highest concentrations of displaced Syrians, impacting natural resources;
- Focus on areas presenting security challenges and social stability issues;
- Focus on vulnerable groups, households, and individuals (i.e. female/child-headed households, elderly or disabled persons and minors, children in schools or hospitals) for specific assistance, and;
- Focus on public institutions providing vital services to displaced Syrians and vulnerable host communities affected by their presence.

Total sector needs and targets: 2020

At the individual level, the sector has identified the following needs at the individual level:

Population Cohort	Total Population in Need	Targeted Population	No. of Female	No. of Male
Lebanese	1,219,094	406,365	-	-
Displaced Syrians	816,367	272,122	-	-
Palestinian Refugees from Syria		-	-	-
Palestinian Refugees in Lebanon		-	-	-
GRAND TOTAL	**2,035,461**	**678,487**		

Through activities under Outcome 1 and Outcome 3, the sector expects to target 406,365 vulnerable Lebanese (199,119 male and 207,246 female) and 272,122 displaced Syrians (133,340 male and 138,782 female), with benefitting from increased energy production. Palestinian refugees are expected to be targeted in 2020.

At the institutional level. The sector will target:

Type of Institutions	Total	Targeted
Municipalities	251	All municipalities hosting refugees
Hospitals/healthcare institutions (PHC, etc)	608	29 Governmental hospitals, 218 PHC, 128 SHC, 233 SDC
Public Schools	343	343
Central Ministries	1	MoEW
Electricite du Liban	1	1
Water Establishments	4	4

Mainstreaming of accountability to affected populations, protection, conflict sensitivity, age and gender, youth, persons with specific needs and environment

Conflict sensitivity: Electricity generation through renewable energy, provision of energy-efficient products, off-grid solar photovoltaic streetlights, and reinforcement of the transmission and distribution networks are all activities that improve the quality and quantity of electricity supply, thus reducing social tensions between Lebanese host communities and displaced Syrians.

People with specific needs: Special attention would be given to prioritize service provision to persons with a disability, families with young children, and elderly persons.

Environment: Renewable energy sources, use of energy-efficient products, and connections to the grid are the best examples on how the sector would help in reducing the impact of the Syria crisis on air quality in Lebanon through reducing the use of diesel generators.

Endnotes

i. MoEW (2019), Update Policy Paper for the Electricity Sector.
ii. MoEW and the Lebanese Center for Energy Conservation (2016), The National Renewable Energy Action Plan for the Republic of Lebanon 2016-2020.
iii. MoEW and Lebanese Center for Energy Conservation (2016), The Second National Energy Efficiency Action Plan for the Republic of Lebanon 2016-2020.
iv. UNDP (2018), Prioritization and Assessment of Value Chains within the Renewable Energy Sector in Lebanon.
v. UNDP (2018), Sustainable Energy for Lebanese Villages and Communities: The Village 24 Initiative.

Children playing in Tripoli old souks.
Photo Credit: UNDP, Rana Sweidan, 19/06/2019.

Sector Logframe

Outcome 1: Increase energy production through implementation of renewable energy sources

Indicator 1	Description	Means of Verification	Unit	Frequency
Amount of MWh produced through new renewable energy sources		Project reports from partners in Activity info.	MWh	monthly

MWh/year

Baseline	Result 2018	Result 2019	Target 2020
	1,741		116,300

Outcome 2: Reduce energy demand due to implementation of energy efficient initiatives

Indicator 1	Description	Means of Verification	Unit	Frequency
Reduction resulting from installed capacity through energy efficient measures in MWh		Project reports from partners in Activity info	MWh	monthly

MWh/year

Baseline	Result 2018	Result 2019	Target 2020
			30,000

Outcome 3: Improve access to electricity through Rehabilitation and Reinforcement works on the Transmission and Distribution networks

Indicator 1	Description	Means of Verification	Unit	Frequency
Number of people benefiting from rehabilitation and reinforcement works on the transmission and Distribution networks		Partners report in activity info	Individuals	Monthly

Lebanese				Displaced Syrians				Palestinian Refugees from Syria (PRS)				Palestinian Refugees from Lebanon (PRL)			
Baseline	Result 2018	Result 2019	Target 2020	Baseline	Result 2018	Result 2019	Target 2020	Baseline	Result 2018	Result 2019	Target 2020	Baseline	Result 2018	Result 2019	Target 2020
	13,969		263,912		6,286		107,828								

Outcome 4: Enhance capacity of MoEW to plan, budget and oversee energy sector initiatives

Indicator 1	Description	Means of Verification	Unit	Frequency
Number of new energy initiatives resulting from capacity development and support to MoEW	Number of projects identified and implemented by the recruited staff at MoEW	Activity Info and/or direct reporting to LCEC/MoEW	Number of projects	Yearly

Projects

Baseline	Result 2018	Result 2019	Target 2020
	1		66