ENERGY
SECTOR

PEOPLE IN NEED

3,309,487

PEOPLE TARGETED

1,119,172

REQUIREMENTS(US$)

2018 99.2 million

2019 172 million

PARTNERS

10

GENDER MARKER

2a

CONTACTS

LEAD MINISTRY

Ministry of Energy & Water (MoEW)

Suzy Hoayek

Suzy.hoayek@gmail.com

COORDINATING AGENCY

UNDP

Noritaka Hara

noritaka.hara@undp.org

SECTOR OUTCOMES

Outcome #1 — $39.1 m

Increase energy production through implementation of renewable energy sources.

Indicators

Increase in MWh resulting from installed capacity through 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 persons reached through installation of necessary equipment to reinforce the transmission network.

Number of persons reached through installation of necessary equipment to reinforce the distribution network.

Outcome #4 — $1 m

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

Indicators

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

POPULATION BREAKDOWN

POPULATION COHORT	PEOPLE IN NEED	PEOPLE TARGETED	51% Female	49% Male
Lebanese	1,500,000	626,707	319,620	307,086
Displaced Syrians	1,500,000	492,464	251,157	241,307
Palestine Refugees from Syria	31,502			
Palestine Refugees in Lebanon	277,985			

Situation analysis and context

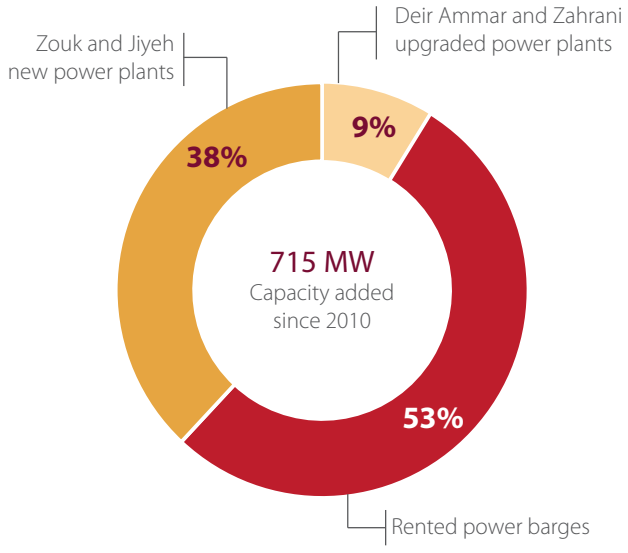
The increased electricity demand caused by the Syrian Crisis has created additional stress on Lebanon's already-weak electricity system, and underscored its lack of resilience. A study undertaken by the Ministry of Energy and Water (MoEW) and UNDP revealed an additional 486 megawatts (MW) of power supply are needed to cover the increased demand of the 1.5 million displaced Syrians in Lebanon.[i]

In 2010, prior to the onset of the Syrian Crisis, the Government of Lebanon (GoL) recognized the critical need to address energy-sector issues and endorsed a Policy Paper for the Energy Sector in June 2010.[ii] The paper outlines policies, investments, and reforms aimed at increasing the level and quality of electricity supply, managing demand growth, decreasing the average cost of electricity production, increasing revenues, and improving sector governance. The paper outlines a set of well-articulated initiatives that ultimately aim to improve service delivery and reduce the fiscal burden that the sector places on public resources. Notably, the policy paper also commits to launching, supporting, and reinforcing all public, private, and individual initiatives to use renewable energies to reach 12 percent of electric and thermal supply by 2020. To support this target, the National Energy Efficiency and Renewable Energy Action (NEERA) national financing mechanism was initiated in 2010, targeting initiatives led by the private sector in renewable energy and energy efficiency.

Several projects increasing electricity supply have been initiated since 2010. By the end of 2017, the MoEW and Electricité du Liban (EdL) will have provided an additional 715 MW in energy supply capacity through the following projects:

- The upgrading and rehabilitation of the Deir Ammar and Zahrani power plants, resulting in additional capacity of 63 MW**;**

Added Capacity since 2010 (MW)



- The addition of stand-by capacity through rented power barges, providing an additional 380 MW; and
- The establishment of two new power plants in Zouk and Jiyeh (annexed to the existing plants), adding 272 MW to the national grid.

To date, EdL has 2,720 MW[1] of installed capacity (not necessarily generated) available at peak supply, which is almost 80 percent of the current peak demand of 3,400 MW.[2]

In addition, significant progress has been made toward the GoL's renewable energy goal. In 2016, the cumulative installed capacity of solar photovoltaic (PV) electricity reached 23.07 MW, representing a 112 percent growth rate in 2015; solar PV accounted for 0.26 percent of the EdL's total electricity generation in 2016.[iii] Total investment in the solar PV sector grew by 71 percent from 2015, amounting to over US$57 million, 49 percent of which was funded by the NEERA loan programme, indicating that these types of soft loans are beneficial to the Lebanese renewable energy market. Even though this growth was achieved by small-scale projects (the average size of each project is 37 kilowatts (kW)), large-scale renewable energy projects are also in progress. In 2017, the MoEW issued a request for proposals for the installation of 180 MW of solar PV. In addition, the Council of Ministers recently approved the permits for private companies to operate wind turbines for electricity generation. The capacity of these wind farms is expected to be 200 MW.

As described above, the implementation of the Government's reform and investment programs is underway, but it is being hindered by financial and political obstructions. Until these programmes are fully implemented, Lebanon's electricity sector will continue to underperform, and therefore remain a significant burden on public resources. The sector will therefore continue to be highly vulnerable to the shock of increased demand brought about by the displacement of a significant Syrian population to Lebanon.

In addition to simply having insufficient installed generating capacity, the efficiency of the existing system is below normal levels due to poor maintenance, deterioration of facilities, high losses, and the need for reinforcement of the transmission network. Already in 2010, the electricity losses were estimated at 15 percent by technical losses, 20 percent by non-technical losses, and 5 percent by uncollected bills.[ii]

Deteriorating and inadequate infrastructure has resulted in poor reliability and inadequate levels of electricity supply. Service delivery standards are low compared to other countries with similar per capita GDP. Even prior to the Syrian Crisis, Lebanon suffered extensive load-shedding, with supply cuts in Beirut of at least 3 hours per day and up to 12 hours per day outside of Beirut. The

(1) Theoretically, 2,720 MW is the maximum capacity of all power plants; however, at no point is EdL capable of supplying the available energy due to aging plants that require recurrent closing for maintenance, and to losses generated from operating other inefficient or costly processes.
(2) 3,400MW includes demand of all consumers on Lebanese territory.

majority of consumers are therefore forced to rely on costly and environmentally unfriendly diesel generators to provide the balance of their electricity requirements.

The sector is causing a massive drain on the GoL, which subsidizes the cost of fuel used in EdL's power plants. The sector cost the Government $3.056 billion in 2014, $2.056 billion in 2015, and $2.1 billion in 2016.[3]

With tariffs set below cost recovery, high system losses, and low revenue collections, the sector is entirely reliant on public resources to subsidize the purchase of fuel for power generation.

In September 2015, the GoL signed the UN's resolution regarding the adoption of 17 Sustainable Development Goals (SDG), the seventh of which is: Ensure access to affordable, reliable, sustainable, and modern energy for all. To this end, the MoEW is currently collaborating with the Prime Minister's Office to draft the Energy chapter of the National Strategy for Sustainable Development, which is in line with the Government's Policy Paper and renewable energy strategies. The World Humanitarian Summit in 2016 placed the SDGs at the core of humanitarian response planning; SDG6 (access to water and sanitation), SDG3 (access to healthcare) and SDG4 (access to education) depend largely on the availability of electricity (SDG7).

1.1 Impact of the Crisis on the Lebanese Electricity Sector

The displacement of a significant Syrian population to Lebanon due to the ongoing crisis is placing additional stress on an already weak and inefficient electricity system. The most immediate impact of this additional population is evident through a significant increase in electricity demand. This increase is created by:

- The connection of improvised accommodations such as informal settlements, collective sites, substandard shelters, and unfinished buildings to the electricity grid;
- Increased residential load where refugees are being hosted in Lebanese households;
- Increased residential load where refugees are renting accommodations; and
- Increased load from hotels and other rented accommodations, where occupancy is above normal rates.

Already before the crisis, the Lebanese energy sector was weak, inefficient, and unable to meet the electricity demand. It had reached a point where electricity reliability and service delivery had become significant impediments to economic development, and where financial sustainability was unattainable without major reform.

The additional demand created by the displaced Syrians is therefore an increased burden on a deficient system. The increased demand created by the increase in population is either being met through privately operated generators or through illegal connections to the national grid (approximately 45 percent[4] of displaced Syrians have such connections). These illegal connections result in significant technical damage to the grid and increase maintenance and reparation costs, resulting in additional losses to the electricity sector. This leads to reduced supply quality and quantity, and lost economic opportunities for the Lebanese population.[4]

The fees collected for every supplied kilowatt hour (kWh) do not cover the production and operation costs, and therefore do not allow further rehabilitation or extension of the grid. This is further exacerbated by the unpaid bills of customers illegally connected to the grid.

Moreover, and based on a UNHCR assessment,[v] significant electricity fees are being paid by the displaced Syrians to EdL, as well as for the use of privately owned generators, which is increasing their already fragile economic situation.

It is also important to understand that energy is a cross-cutting element along all sectors, and the exacerbated situation of electricity supply has negatively impacted the following social and security problems:

1. In addition to their uncovered operation and maintenance costs, the expenses of the Water Establishments (WE) have greatly increased due to their reliance on diesel generators to operate pumps at water sources to meet the required water demand. Furthermore, the electricity cuts lead to insufficient treatment of wastewater, causing a threat to public health and to the environment;
2. The lack of electricity results in dark roads and contributes to security-related problems. Municipalities are forced to prioritize renewable energy for street lights to reduce robberies and other security issues;
3. Healthcare institutions are forced to rely more on private generators due to the insufficient supply hours and the poor quality of the supplied electricity;
4. The electricity bills of public schools have doubled since the crisis, as they provide double shifts to ensure education for displaced Syrian children;
5. Due to the inadequate electricity supply, Lebanese enterprises are facing increased costs, disruption of production, and reduction of profitability, resulting in a major impediment to the business environment and loss of economic opportunities;[vi] and
6. The environmental cost of the additional reliance on diesel generation has not been calculated, but should also be considered. It is important to assess the indirect costs of using fuel for household heating and transportation, and their impact on greenhouse gas emissions. The environmental impacts on air quality and on people's health have been looked

(3) The decline in value of subsidies in 2015 and 2016, relative to 2014, is due to the decline in the cost of fuel in the world.

(4) Bad electricity supply causes economic losses to businesses, which would be more productive if electricity supply was improved and if the costs of private generators were reduced.

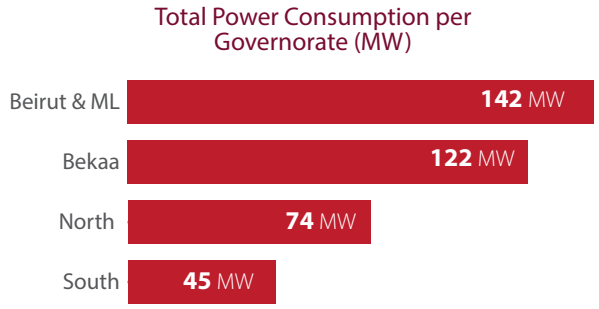
at briefly in the Environmental Impact Assessment of the Syrian Crisis,[vii] but need further investigation and study.

The unexpected increase in demand makes upgrading of the electricity infrastructure essential in order to provide this service in line with national norms and standards, safely and equally to all. In the Lebanese context, electricity is a humanitarian need, directly linked to the provision of vital services and, to a large extent, to security and social stability.

1.2 Quantified Impact on Lebanon's Energy Sector

The MoEW, in collaboration with UNDP, has conducted a study entitled "The Impact of the Syrian Crisis on the Lebanese Power Sector and Priority Recommendations."[iv] The study calculates an additional electricity generation requirement of 486 MWiv to supply the demand of 1.5 million displaced Syrians, which takes into account 15 percent technical losses at the generation level. The distribution of the electricity consumption of displaced Syrians across the Governorates is shown in Figure 1 below.[iv]

Power Consumption of displaced Syrians



The burden of supplying this additional demand implies two service and financial needs:

A. Needs of the Government to cover the cost of supplying electricity to the displaced Syrians

The yearly consumption of Syrian households amounts to 2,013 Gigawatt hours (GWh)/year[5] – an average power consumption of 428 MW, or an equivalent capacity that should be generated by EdL's existing power plants of 486 MW.[6] Knowing that the average production cost is currently USC13.5/kWh (USC/kWH),[7] and that fees are collected at a subsidized rate of 8.97 USC/kWh (equally from Lebanese and others), the cost of providing an additional 486 MW is estimated at $313 million in 2016, causing an estimated deficit[8] of $222 million per year. These losses are covered by the GoL, which already lacks the means to cover its subsidies to the sector, and is therefore not in a position to afford additional expenses.

At least 45 percent of the electrical connections of Syrian households to the grid are done in an illegal manner, which not only implies lost sales to the already exhausted Government and EdL, but also incurs technical losses on the grid and deprivation of other legally connected customers of proper electricity.

B. Cost to Lebanese consumers of alternative electricity supply

Since 2010, the MoEW has made an effort to increase electricity production by 715 MW, in order to achieve an additional supply of four hours. Despite this effort, the available hours of power to Lebanese consumers have remained constant at an average of 14 hours per day between 2012 and 2016. Additional outage hours at peak times are more frequent and the quality of the supplied electricity has decreased due to the overloaded transmission and distribution networks. Lebanese consumers are therefore forced to meet the lost supply through more expensive options, such as private generators, adding an additional burden on a population already suffering from an economic crisis. The economic cost of providing around 486 MW of additional power at 8.97 USC/kWh is borne by the Lebanese, who pay for private generation at a unit rate of 14.5 USC/kWh, or around $292 million in 2016, resulting in $111 million losses incurred by Lebanese consumers.

Therefore, the overall losses on Lebanon's energy sector resulting from displaced Syrians is $333 million per year, or $1.33 billion between 2017 and the end of 2020.[9]

1.3 Challenges and Ongoing LCRP Interventions in the Energy Sector (2017)

The main challenge of the sector remains raising funds and advocating for the importance of the sector. Electricity in Lebanon remains a controversial issue: the challenges that the sector faced prior to the Syrian Crisis have been severely exacerbated by the extra consumption of electricity, causing more losses to the Government and to the Lebanese population, as described above.

As of July 2017, five partners were actively implementing projects in the Energy sector. The current projects implemented by these partners focus on installation of renewable energy equipment and rehabilitation of the electricity distribution networks. In terms of the installation of renewable energy, off-grid street lighting has been installed in 39 vulnerable municipalities. The implementation of several other renewable energy projects is in progress. 79,000 of 277,140 targeted individuals are benefiting from improved electricity supply through the installation of new transformers. Through a project that aims at the prevention of illegal connections, a total of 214 legal electrical connections, along with net metering systems, have been installed in Bekaa, Akkar, Baalbek, and the North.

(5) This figure corresponds to 5,514,630 KWh consumed per day by the 1.5 million displaced Syrians.
(6) This figure is the capacity required at production level to supply energy at a consumption level equivalent to 428 MW plus 15 percent to account for technical losses.
(7) This figure is not constant, as it fluctuates with the cost of fuel worldwide. Before 2015, the cost of production was much higher.
(8) This represents the difference between the fees collected from displaced Syrians and the cost of production for 486 MW.
(9) Assuming that the Syrian population in Lebanon will remain at 1.5 million, fees, rates of collection, and percentage of illegal connections will remain constant until 2020.

Overall Sector Strategy 2018-2020[10viii]

The overarching objective of the Energy sector in Lebanon is to improve access to electricity at agreed minimum standards to households affected by the Syrian Crisis, and across sectors providing vital services. It aspires to provide electrical services to Lebanese host communities and displaced Syrians in an equitable manner, while also reducing the negative impact of the crisis on the environment and limiting the financial impact on the Lebanese Government and consumers. This overall objective is summarized in the following impact statement:

By the year 2020, all vulnerable populations in Lebanon will have improved, equitable, and gender-appropriate access to electricity in terms of quality, quantity, and sustainability.

By enhancing electrical 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. Thus, the theory of change of the Energy sector toward these overall objectives is as follows.

To achieve the third objective, the Energy sector must increase the capacity of electricity generation to fill the supply/demand gap, expanded by the influx of displaced populations, in an environmentally friendly manner. In addition, the rehabilitation and reinforcement of the electricity network are critical to increase the network's capacity to deliver quality electricity to additional end-users, especially to the most vulnerable people and communities. For that to happen, it is essential to enhance the capacity of implementing partners, such as the MoEW and other actors, which have been overburdened due to the crisis response. As for the fourth objective, it is reported that the increased electricity generation by diesel generators is affecting air pollution in Lebanon. To mitigate that impact, reduction of electricity demand is needed.

Before the outbreak of the Syrian Crisis, the MoEW had been improving Lebanon's electricity infrastructure, guided by the Policy Paper for the Electricity Sector (MoEW, 2010) and the other national action plans for renewable energy and energy efficiency. The strategy for the LCRP Energy sector is built on these national strategies, while also taking into account various vulnerability assessments to understand and identify where the most urgent and critical needs exist.

Consequently, the required interventions can be summarized as follows:

- Capital investment in generation capacity and associated transmission and distribution networks to meet the additional demand created by the displaced Syrians; and
- Supporting the implementation of the Government's development plans through increased institutional capacity and technical assistance.

While the MoEW 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 Syrian Crisis on the sector.

Sector outcomes, outputs and indicators

The strategy is based on four outcomes, reflecting the above-stated overarching objective and impact. The strategy entails five outputs towards implementation, and an overall budget of $443 million over the remaining three years of the LCRP. In view of the lack of funds disbursed into the Energy sector in 2017, the budget of 2017 is shifted to 2018, where it is estimated at $100 million, and the targets and budget of the fourth year are equally distributed over 2019 and 2020.

In the following section, outcomes, outputs and activities of the Energy sector under the LCRP are presented together with an implementation plan, target, and budget.

Outcome 1: Increase energy production through implementation of renewable energy sources[11]

This outcome seeks to increase the capacity of electricity supply to fill the expanded gaps due to the influx of displaced populations. This outcome is based on the MoEW's study of the implications the Syrian Crisis has had on electricity.[iv]

- Power Consumption: 359,430 kW outside the informal settlements and 30,075 kW inside the informal settlements
- Energy Consumption per day: 5,120,196 kWh outside the informal settlements and 394,434 kWh inside the informal settlements

Output 1.1: Renewable energy systems implemented

Activities under this output aim at implementing projects that can partly satisfy the additional energy requirements through renewable energy sources, while providing affordable alternative energy to vulnerable people. Based on Lebanon's current market and legal situation, and technical studies, the activities listed below are proposed as cost-effective interventions and

(10) The Energy sector is guided by the broader strategies and plans of the GoL; principal among these are the Policy Paper for the Electricity Sector (MoEW, 2010); the National Energy Efficiency Action Plan for Lebanon (NEEAP 2016-2020), the National Renewable Energy Action Plan for Lebanon (NREAP 2016-2020), and the Lebanon Environmental Assessment of the Syrian Conflict and Priority Interventions (MoE, 2014) and its updates. In addition, it uses various assessments conducted by MoEW in collaboration with different agencies to understand where the most urgent and critical needs are, such as the "Survey and Assessment of the Implications on Electricity in Lebanon from the Current Syrian Crisis and the Prioritization of Interventions" (UNDP, 2016), the Economic and Social Impact Assessment of the Syrian Conflict in Lebanon (World Bank, 2013), and the Vulnerability Assessment of Syrian Refugees (VASyR, 2016).

(11) Activities and corresponding figures under outputs 1 and 2 have been calculated by the Lebanese Center for Energy Conservation (the technical partner of MoEW for renewable energy, also known as LCEC) specifically to mitigate impact of displaced Syrians on energy in Lebanon.

used for the calculation of the required budget.

a. Solar water heaters for residential facilities:

This activity optimistically targets a total number of 291,222 households divided equally between vulnerable Lebanese and displaced Syrians. If fully implemented, this activity would save 750,000 megawatt hours (MWh) per year and cause a yearly reduction in carbon dioxide emissions of 500,000 tons. It demands the biggest share of the sector's budget, amounting to around $261 million throughout the planning period, but is a sustainable measure that would remain a renewable energy source for the Lebanese beyond the current crisis.

b. Solar off-grid lighting around informal settlements and on public municipal streets:

It is recommended to install about 5,000 off-grid solar lighting poles in different outdoor areas – around informal settlements and on main roads in municipalities hosting vulnerable populations. This would ensure safer movement for both Lebanese communities and displaced Syrians. The total budget is $6 million.

c. Solar pumping for public wells:

Water Establishments have been suffering from additional expenses on private generators to supply additional volumes of water to localities with a high concentration of displaced Syrians. Providing solar panels to power pumps at public wells would reduce the generator bills, and would be an environmentally friendly energy source that requires minimum maintenance. The maximum estimated installed capacity is 7 megawatt-peak (MWp),[12] and can be distributed among vulnerable localities according to the pumping requirements and land availability surrounding the public well. The total budget is $10.5 million.

d. Distributed renewable energy power generation:

This activity recommends the installation of decentralized power generation from renewable resources to serve a small community or public institution. This activity targets vulnerable localities and is intended to provide cheaper electricity to consumers, and to alleviate the demand on the national grid. This intervention also addresses the fact that the most affected areas are those where electricity transmission is very weak and the distribution systems are overloaded. The common technologies for decentralized power generations are as follows:

- Solar PV (including the hybrid system with grid-electricity and diesel generator);
- Biomass energy utilization (e.g. biogas, solid waste incineration (waste-to-energy));
- Ground source heat pumps;
- Micro-hydropower;
- Small-wind turbines; and
- Cogeneration systems (combined heat and power systems).

The National Renewable Energy Action Plan for Lebanon (NREAP 2016-2020) lays out the potential of these technologies and national implementation strategies in broader contexts. Furthermore, the technical guidelines for these technologies in the Lebanon context are available on UNDP's website[13] and the Lebanese Center for Energy Conservation (LCEC) will be able to provide sector partner with technical and coordination assistance to support effective and efficient project formulation.

For the case of solar PVs, the maximum estimated installed capacity is 7.5 MWp and can be distributed among the different Governorates. The total budget allocated to this activity is $11.25 million between 2018 and 2020.

Outcome 1: Summary of Proposed Activities, Energy Savings and Budgets for 2018-2020:

The required budget to achieve Outcome 1 is estimated based on the proposed activities. The implementation of these activities under Output 1.1 will reduce the demand on the national grid and the distribution and transmission networks, decrease the losses on EdL, and, more importantly, provide better-quality and cheaper electricity to both the Lebanese host communities and displaced Syrians, and as such impact positively their economic vulnerability.

Table 1: Summary of Proposed Activities, Energy Savings and Budgets for 2018-2020 for Outcome 1:

Source	Energy Saving in 2018 (MWh/yr (15%)	Budget 2018 ($)	Energy Saving 2019-2020 (MWh/yr) (85%)	Budget 2019-2020 ($)	Total yearly CO2 emissions reduction (tons)
Solar water heating for residential facilities	112,500	35,000,000	637,500	198,000,000	500,000
Solar off-grid lighting	328.5	900,000	1,861.5	5,100,000	1,423
Solar pumping	1,680	1,575,000	9,520	8,925,000	7,280
Distributed renewable power generation	1,800	1,687,500	10,200	9,562,500	7,800
Total	**116,309**	**39,162,500**	**659,081**	**221,587,500**	**516,503**

(12) Based on estimation of land availability around areas with high concentration of refugees.

(13) www.cedro-undp.org

Outcome 2: Reduce energy demand through the 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 Syrian, 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).

Based on the type of shelter/facility and the same population assumptions as in Outcome 1, the proposed energy efficiency activities are as follows.

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

This output aims at reducing energy consumption and thereby alleviating the increased burden of electricity costs among vulnerable people by implementing energy efficiency measures. Based on the type of shelter/facility and the same population assumptions as in Outcome 1, the following energy efficiency activities are proposed:

a. LED lighting and solar cookers in households:

The needed number of LED lamps is estimated to be eight for households not residing in informal settlements and two for households residing in informal settlements, which is equivalent to 2,415,000 lamps for the 333,869 displaced Syrian households targeted. Also, it is assumed that electric stoves can be successfully replaced by solar cookers in 20 percent of the households, equally divided between vulnerable Lebanese and displaced Syrians.

Improved lighting would foster protection of women and children and would ensure a higher degree of safety in buildings and households. These energy-efficient measures would reduce the electricity bills of consumers as well as alleviate the demand on the national grid. The total budget is $35.4 million.

b. LED lighting and lighting control in public schools:

This proposed measure aims at reducing additional lighting consumption due to the afternoon second shifts in public schools. Installing LED lighting and motion detectors will reduce the electricity bill for these schools. The total budget is $960,000.

c. Energy audits in hospitals and implementation of measures:

According to the Ministry of Public Health, there are 29 Governmental hospitals in Lebanon.

Energy audits are required in hospitals in order to identify the energy consumption profiles and implement recommended energy efficiency measures. The measures would be mainly related to efficient lighting, lighting control, and water heating. Reducing electricity demand in hospitals will improve the quality of the supply, and as such will reduce their reliance on private generators and the consequent expenses. The total budget is $6.3 million.

d. Walk-in energy audits in PHC, SHC, SDC and implementation of measures:

As per the Ministry of Social Affairs and the Inter-Agency Information Management Unit, there are 220 primary healthcare centres (PHC), 128 secondary healthcare centres (SHC), and 220 social development centres (SDC) in Lebanon.

In such types of facilities, a walk-in energy audit is sufficient to replace conventional lighting with LED lighting. Reducing electricity demand in these facilities will improve the quality of the supply, and as such will reduce their reliance on private generators and the consequent expenses. The total budget is $6 million.

e. Energy Saving Measure in the Agriculture Sector – Variable Speed Drives (VSD) for Water Pumps

Increasing water scarcity is threatening the agriculture sector in Lebanon. With a total of 841 public wells in Lebanon, the total discharge amounts to 248,775,097 m^3/year.[ix] Thus, it is critical to promote rational and efficient use of water resources. By installing variable-speed drives (VSD) on water pumps, the energy consumption would be reduced by 50 percent, resulting in major energy savings to Water Establishments and a reduction in electricity and fuel bills. This technology will allow farmers to save energy and money when using irrigation pumps, and will lead to a rational use of water resources and reduced pressure on groundwater, benefiting the Energy, agriculture, and Water sectors. The total budget is $1.5 million (corresponding to VSD pumps in 340 public wells).

Outcome 2: Summary of Proposed Activities, Energy Savings and Budgets for 2018-2020:

The required budget and its energy saving effect to attain Outcome 2 is calculated on the basis of the proposed activities.

Table 2: Summary of Proposed Activities, Energy Savings and Budgets for 2017-2020 for Outcome 2:

Source	Energy Saving in 2017 (MWh/yr)(15%)	Budget 2017 ($)	Energy Saving 2018-2020 (MWh/yr) (85%)	Budget 2018-2020 ($)	Total yearly CO2 emissions reduction (tons)
Indoor LED Lighting	13,487	4,3500,000	76,424	24,650,000	56,200
Solar Cookers	12,994	963,000	73,631	5,457,000	56,300
Schools – Indoor LED Lighting	151	120,000	857	680,000	655
Schools – Motion Detectors	-	24,000	-	136,000	-
Hospitals – Energy Audits	-	290,000	-	-	-
Hospitals – Measures Implementation	-	900,000	-	5,100,000	-
PHC, SHC, SDC – Walk-in Energy Audits and Implementation	-	900,000	-	5,100,000	-
Horizontal Measure – VSD for Pumps	3,358	225,000	19,031	1,275,000	14,933
Total	**30,000**	**7,772,000**	**170,000**	**42,398,000**	**128,100**

Following the implementation of Outcome 1 and Outcome 2 above, the total load reduction from the national grid will be 975,400 MWh/year, or 191 MW/year.

The energy consumption by displaced Syrians that remains to be covered is 2,314,706 - 975,400 MWh/year = 1,339,306 MWh/year, equivalent to 256MW/year.

Irrespective of the source of power production, the increased load borne by the transmission and distribution networks requires rehabilitation and/or reinforcement of the networks, as detailed in the following sections.

	Energy Saving 2018 - 2010 MWh/year	Budget 2018-2020 M$	Total yearly CO2 emissions reduction (tons)
Outcome 1	775,400	260.75	2,066,012
Outcome 2	200,000	50.17	512,400
Total 1 + 2	**975,400**	**311**	**2,578,412**

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 work on the distribution network, as described hereafter.

Output 3.1: Transmission network reinforced through the installation of HV/MV 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 in the power plants to medium voltage. The medium voltages used in Lebanon are 220 kV, 150 kV, and 66 kV. In some areas 33 kV voltage is still used.

Currently, the transmission network is being rehabilitated and upgraded as per the National Electricity Policy Paper, with the following projects being implemented by MoEW under law 181/2011:

1. Substations: 3 Gas-Insulated Switchgears, 220 kV, in Dahieh, Achrafieh, and Bahsas;
2. New transformers: 6 new 70 Mega Volt Amps (MVA) have been added in existing substations in Deir Nbouh, Deir Ammar, Zouk, Bsalim, Zahrani, and Sour;
3. Capacitor banks have been added inside remote substations to sustain the level of voltage in Nabatieh, Sultanieh, Labiue, Hermel, and Qobayyat;
4. A 66 kV double-circuit overhead transmission line from Deir Nbouh to Baalbeck, passing through the substations of Bared, Halba, Qobayyat, Hermel, Laboue, Bidnayel and Baalbeck has been installed; and
5. EdL is executing two 220 kV substations in Saida and Baalbeck.

Hence, a total of around 1100 MVA are currently being added to the capacity of the transmission network.

Regions with large populations of displaced Syrians are fed by substations on the 66 kV network. Most of these substations are overloaded. They require rehabilitation and upgrading, as well as reinforcement of the corresponding 66 kV overhead transmission lines.

As a result, the Syrian 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 resulting from the additional load carried by the substations.

In conclusion, and based on the ongoing MoEW study on power consumption rates per Caza, it can be deduced that the following substations should be upgraded or completely reconstructed, depending on the available space. The table below shows work currently under execution or planned to be carried out by MoEW/EdL. If implemented, these works would result in better voltage-quality of the electricity supplied to consumers, a reduction in the losses of the transmission system, and, consequently, an increase of supply hours.

Table 4: Summary of Outcome 3:

Governorate	66 kV outgoing Bay	66 kV incoming Bay	20 MVA transformer	40 MVA transformer	MV Switchgears	Current Works by MoEW/EDL
Hermel	2	1	1		1	upgrading the 66 kV Overhead Transmission Line (OHTL)
Laboueh	2	1	1		1	
Anjar	2	1	1		1	
JibJanine	2	1	1		1	
Marjeyoun	2	1	taken From Nabatieh SS		1	upgrading the 66 kV OHTL from Sultanieh to Marjeyoun S/S
Nabatieh				1	1	
Beiteddine	2	1	1		1	EDL is upgrading the 66 OHTL
Sibline				1	1	
Kobayat	2	1	1		1	MoEW is upgrading the 66 kV OHTL linking Kobayat to Halba and Hermel S/S.
Halba	2	1	1		1	MoEW is upgrading the 66 kV OHTL linking Halba and Kobayat and Bared S/S.
Total (Units)	16	8	7	2	10	
Estimated Budget ($/Unit)	250,000	250,000	300,000	450,000	500,000	
Total Budget 2017-2020 ($)				**14,000,000**		

Output 3.2: Distribution network reinforced through the installation of MV/LV transformers

The distribution network is the final stage in the delivery of electric power. Its function is to reduce the medium voltage (MV) carried by the transmission substation to a low voltage (LV). The medium voltage is carried by MV feeders (cables) to the transformers, which reduce the current to a low voltage, usable by consumers. A distribution network consists of the following elements:

1. Primary distribution cables (MV feeders) carry the medium voltage to MV/LV transformers. These cables can be underground or overhead;
2. Transformers, supported with network-protection devices and accessories, reduce the medium voltage to low voltage ; and
3. Poles and cables, through which LV current is carried to consumers.

In the context of implementing the Policy Paper, the majority of the distribution network in Lebanon has been rehabilitated in all Lebanese areas since 2010.

However, the sudden overloading of these networks, as a result of the presence of displaced Syrians in the country, is resulting in:

1. Failure or damage of distribution transformers;
2. Additional losses in the systems, especially with the increased number of illegal connections to the grid;
3. Poor quality of the electric current reaching consumers;
4. Decreased supply hours due to the incapacity of transformers to accommodate additional load; and
5. Deprivation of electricity to Lebanese host communities.

Today around 18,200 transformers service more than 5.85 million Lebanese and displaced, which implies that each unit is servicing 320 people, instead of 220 people, as planned before the crisis.

To address this situation, a number of projects have been proposed to mitigate the effects of the additional electricity consumption. These projects will provide reliable access to electricity, reduce the technical losses in areas of high consumption, and provide displaced Syrians with more reliable power to cover their needs.

To account for the 486 MW generated and servicing additional populations, MV/LV transformers and their related poles, cables, network protection devices, and accessories require the provision of 2,250 fully operational transformers (their distribution depends on population consumption and density).

In general, it is necessary to rehabilitate 1,535 of the existing 18,200 transformers and to install 700 new transformers in highly vulnerable communities in order to improve services to both Lebanese and displaced Syrians. However, a more detailed assessment will be conducted to make sure that rehabilitation work is done on transformers that have been damaged or are underperforming as a result of the additional load.

To have a significant impact by the end of 2018, it is planned to rehabilitate 40 percent, or 280, of the transformers in the coming year, and to add 614 new ones. The proposed work would cost around $46 million out of a total budget of $115 million over three years.[1]

For a baseline population of 1.5 million displaced Syrians, the cost/person/month, corresponding to the cost of rehabilitating a portion of the distribution network, does not exceed $1.6/person/month or 19$/year.

If this proposed work on the distribution network is implemented, Lebanese host communities and displaced

(1) Excluding design and supervision costs.

Syrians would feel an improvement in the quality of the electric current supplied, and an increase in the number of hours supplied. As such, their reliance on private generators would decrease, and their bills would be less of a burden. It is also expected that these works would decrease illegal connections to the grid and the losses in the system.

In addition to the rehabilitation of transformers, it is also crucial to prevent illegal connections to reduce the technical loss through the distribution system and appropriately recover the cost of electricity generation.

Proposed Activities: In summary, the table below shows the proposed mitigation work on the distribution network in the coming three years.

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

Output 4.1: MoEW staff specializing in different areas of the Energy sector provided

The Energy Sector Policy Paper is, for the most part, 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 Syrian 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.

Table 5: Summary of Outcome 3.

Governorate/ District	Estimated No. of New Transformers	Estimated No. of Rehab. Transformers	MV Feeders / OH	MV Feeders / UG	Total Budget Per Region ($)
Akkar	50	111	2	1	8,273,042
North	99	217	4	2	16,209,642
Bekaa	79	174	3	2	12,987,253
Baalbek-Hermel	57	124	2	1	9,274,351
Beirut	56	123	2	1	9,189,064
Mount Lebanon	242	531	10	5	39,710,475
South	74	161	3	2	12,068,642
El Nabatieh	43	95	2	1	7,117,280
Grand Total	**700**	**1,535**	**29**	**16**	**114,829,750**

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.

MoEW estimates the budget for a team of senior and junior consultants for the implementation of the above plan, for three years, at $3 million.

Identification of sector needs and targets at the individual, institutional and geographic level

In Lebanon, displaced Syrians are mainly residing in two types of areas:

a. Those living in informal settlements constitute 18 percent of displaced Syrians and are typically located in agricultural areas. They require comprehensive assistance in basic services, especially electricity, to provide them 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 as such reduces social tensions between both populations.

b. Those that have settled within host communities constitute 82 percent of the displaced Syrian population. They typically concentrate in densely-populated urban centers, in particular in already impoverished neighborhoods 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 Palestine Refugees in Lebanon and Palestine Refugees from Syria living in camps in Lebanon, the MoEW and EdL have pending claims with UNRWA extending from 2003 until 2014. These claims are currently being handled by the Ministry of Foreign Affairs. As such, MoEW is in no position, thus far, to take into account the demand of these populations within the LCRP. If solutions are reached within the period between 2018 and 2020, the Energy Plan under the LCRP will be revisited accordingly.

It should be noted that the above proposed plan does not target households in informal settlements for the following reasons:

- The policy of GoL is that no permanent infrastructure should be installed in informal settlements;
- There is a recurrent risk of evictions, which threatens the sustainability of implemented works; and
- The electricity demand of 239,000 Syrians living in informal settlements does not exceed 30 MW, less than 8 percent of the total demand.

Population assumptions under Outcomes 1 and 2 are based on the MoEW's study of the implications of the Syrian Crisis on electricity.[iv]

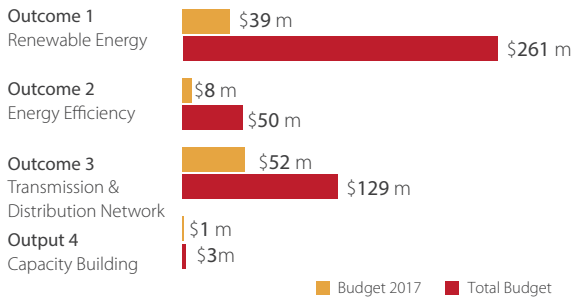
- Number of displaced Syrian households: 333,869 (291,222 not residing in informal settlements and 42,647 residing in informal settlements)
- Number of displaced Syrians: 1,500,000 (1,260,357 not residing in informal settlements and 239,643 residing in informal settlements)

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

4. 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;
5. Implement pre-planned priority projects that are part of the GoL's strategies and masterplans, which ensure vital service provision to the most vulnerable communities in a sustainable manner;
6. Focus on the highest risks of environmental degradation in areas with the highest concentrations of displaced Syrians, impacting natural resources;
7. Focus on areas presenting security challenges and social stability issues;
8. 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;
9. Focus on public institutions providing vital services to displaced Syrians and to vulnerable host communities affected by their presence.

By taking into account the mapping of the 251 vulnerable localities, the Mapping of Risks and Resources (MRR), the priority list of vulnerable municipality requests submitted to MoEW and EdL, and the MoEW/UNDP study, the energy strategy aims to improve electricity services to all vulnerable populations in Lebanon, be they Lebanese or Syrian, within the coming three years, if all the Outputs and activities are fully implemented.

Energy Sector Budget



Population Cohort	Total Population in Need	Targeted Population	No. of Female	No. of Male
Lebanese	1,500,000	626,707		
Displaced Syrians	1,500,000	492,464		
Palestine Refugees from Syria	31,502	-	-	-
Palestine Refugees in Lebanon	277,985	-	-	-
GRAND TOTAL	**3,309,487**	**1,119,172**	**570,777**	**548,393**

Type of Institutions	Total	Targeted
Individuals		
Municipalities	1005	TBD
Unions of Municipalities	46	TBD
Hospitals/healthcare institutions (PHC, etc)	597	90
Public Schools	160	24
Central Ministries	1	MoEW
Electricite du Liban	1	1
Water Establishments	4	4
Communities		
Governorates	8	8
Sites		
Informal Settlements	4,312	4,312
Palestinian Camps	12	TBD
Palestinian Gatherings	42	TBD

Mainstreaming of conflict sensitivity, gender, youth, people with specific needs (PWSN) and environment

Conflict Sensitivity

Electricity generation through renewable energy, provision of energy-efficient products, off-grid PV street lights, and reinforcement of the transmission and distribution network are all activities that improve the quality and quantity of electricity supply, and thus reduce 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 to 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 Syrian Crisis on air quality in Lebanon through reducing the use of diesel generators.

Inter-sector linkages

All vital services in Lebanon depend on the provision of electricity. Therefore, the overstretched condition of the Energy sector is negatively affecting most of the sectors. In addition, the Energy sector has close inter-sector linkages with other sectors in terms of interventions. For instance, the installation of renewable energy (solar water heaters) or energy efficiency products (LED lighting) will directly benefit vulnerable populations and communities by reducing electricity costs while mitigating the burden on national grid, which is perceived by many Lebanese as strained due to the Syrian Crisis. Specific cross-sector links are as follows.

Basic Assistance, Education, Health & Water: The Energy sector's interventions aim at enhancing public service delivery by these sectors through the reduction of electricity costs and the provision of cleaner energy. The Energy sector will coordinate with these sectors when planning and implementing projects to ensure the selection of beneficiaries most in need, or prioritized facilities for support. For example, the Basic Assistance sector is providing vulnerable populations with multi-purpose cash assistance to help them address their basic needs, including utility costs. Thus, in order to reduce the economic vulnerability of vulnerable populations in a sustainable manner, it is very important to install renewable energy and energy-efficient applications in households, which will reduce the use of private generators and contribute to the reduction of electricity fees.

To host displaced Syrians, a large number of 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 of schools. The Energy sector will coordinate with the Education sector and the Ministry of Education and Higher Education to mainstream these measures in the construction and rehabilitation of schools.

As for the Health sector, ensuring uninterrupted power supply is critical for all health institutions, which in most cases is currently ensured by expensive and polluting diesel generators. The installation of renewable energy and energy efficiency measures will reduce healthcare institutions' electricity bills, thereby easing their financial burden and leading to a positive return on investment.

Food Security: The availability, access and affordability of electricity are a crucial factor in the agriculture value chain – from food production to conservation. The promotion of energy-efficient practices in agriculture is emphasized in both the Energy and Food Security sectors. For instance, the installation of energy-efficient water pumping systems will contribute not only to the Energy sector, but also the Food Security and Water sectors. The Energy sector will coordinate with the Food Security sector for agriculture-related activities to ensure the coherent targeting of beneficiaries and the selection of appropriate technologies on the ground.

Livelihoods: An unreliable electricity supply and high production costs have significantly hampered local economic development and job creation in Lebanon.[vi] To address these critical challenges, interventions in the Energy sector will improve the investment climate in Lebanon, which will have a positive impact on energy efficiency and employment opportunities. In parallel, the Energy sector will also make an effort to track the impact of interventions on job creation.

Even though the proposed activites 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, could provide cross-cutting opportunities for the Livelihoods sector. When the Livelihoods sector plans to work on the development of value chains related to renewable energy, energy efficiency, and green building, the Energy sector will provide the necessary information and technical advice, so that partners can efficiently captitalize on knoweldge and resources in the MoEW and other relevant institutions, and ensure strategic alignment with national plans and policies. This coordination will also apply to activites related to vocational training programmes.

Protection & Social Stability: 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 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. MoEW has been undertaking the reinforcement of the distribution network, which is operated and maintained by EdL, by prioritizing the sites based on both local needs and a technical assessment.

Shelter: The Shelter sector promotes the proper installation of electrical connections within targeted shelters, while the Energy sector is responsible for the provision of universal access to electricity for all vulnerable populations. Since illegal connections to the grid undermine the distribution network, it is very important to ensure proper electricity connections from shelters to the national grid. The Energy sector will provide shelter partners with necessary technical support as needed. In the case of the area-based approach pilots, the Shelter sector will work closely with the Energy sector on targeting needs and coordinating planned activities.

Endnotes

i. Lebanon, Ministry of Energy and Water and UNDP (2017), *The Impact of the Syrian Crisis on the Lebanese Power Sector and Priority Recommendations*.

ii. Lebanon, Ministry of Energy and Water (June 2010), *Policy Paper for the Electricity Sector*.

iii. UNDP (2017), *2016 Solar PV Status Report for Lebanon*.

iv. Lebanon, Ministry of Energy and Water and UNDP (2017), *The Impact of the Syrian Crisis on the Lebanese Power Sector and Priority Recommendations*.

v. UNHCR, UNICEF, WFP (2016), *Vulnerability Assessment of Syrian Refugees in Lebanon* 2016.

vi. The World Bank (2013), *Enterprise Surveys: Lebanon-2013*.

vii. Lebanon, Ministry of Environment, European Union, UNDP (September 2014), *Lebanon Environmental Assessment of the Syrian Conflict and Priority Interventions*.

viii. Lebanon, Ministry of Energy and Water (June 2010), *Policy Paper for the Electricity Sector*; Lebanon, Ministry of Energy and Water (March 2016), *Second National Energy Efficiency Action Plan for the Republic of Lebanon: NEEAP 2016-2020*; Lebanon, Ministry of Energy and Water, *National Renewable Energy Action Plan for Lebanon: NREAP 2016-2020*; Lebanon, Ministry of Environment, European Union, UNDP (September 2014), *Lebanon Environmental Assessment of the Syrian Conflict and Priority Interventions*; Lebanon, Ministry of Energy and Water, UNDP (2016), *Survey and Assessment of the Implications on Electricity in Lebanon from the current Syrian Crisis and the Prioritization of Interventions*; UNHCR, UNICEF, WFP (2016), *Vulnerability Assessment of Syrian Refugees in Lebanon 2016*.

ix. Lebanon, Ministry of Energy and Water and UNDP (2014), *Assessment of Groundwater Resources of Lebanon*.

Displaced Syrians in Barr Elias - Bekaa Valley. Photo credit: UNDP, Rana Sweidan, 15/6/17

Sector Logframe

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

Indicator 1	Description	Means of Verification	Unit	Frequency
Increase in MWh resulting from installed capacity through renewable energy sources		Direct reporting to LCEC/MoEW	MWh	yearly

Lebanese				Displaced Syrians				Palestine Refugees from Syria (PRS)				Palestine Refugees in Lebanon (PRL)			
Baseline	Target 2018	Target 2019	Target 2020	Baseline	Target 2018	Target 2019	Target 2020	Baseline	Target 2018	Target 2019	Target 2020	Baseline	Target 2018	Target 2019	Target 2020

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		Direct reporting to LCEC/MoEW	MWh	yearly

Lebanese				Displaced Syrians				Palestine Refugees from Syria (PRS)				Palestine Refugees in Lebanon (PRL)			
Baseline	Target 2018	Target 2019	Target 2020	Baseline	Target 2018	Target 2019	Target 2020	Baseline	Target 2018	Target 2019	Target 2020	Baseline	Target 2018	Target 2019	Target 2020

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 persons reached through installation of necessary equipment to reinforce the transmission network		Activity Info and/or direct reporting to MoEW	#	Quarterly

Lebanese				Displaced Syrians				Palestine Refugees from Syria (PRS)				Palestine Refugees in Lebanon (PRL)			
Baseline	Target 2018	Target 2019	Target 2020	Baseline	Target 2018	Target 2019	Target 2020	Baseline	Target 2018	Target 2019	Target 2020	Baseline	Target 2018	Target 2019	Target 2020
	263,912	197,934	197,934		107,828	80,871	80,871								

Indicator 2	Description	Means of Verification	Unit	Frequency
number of persons reached through installation of necessary equipment to reinforce the distribution network		Activity Info and/or direct reporting to MoEW	#	Quarterly

Lebanese				Displaced Syrians				Palestine Refugees from Syria (PRS)				Palestine Refugees in Lebanon (PRL)			
Baseline	Target 2018	Target 2019	Target 2020	Baseline	Target 2018	Target 2019	Target 2020	Baseline	Target 2018	Target 2019	Target 2020	Baseline	Target 2018	Target 2019	Target 2020

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	# of projects	yearly

Lebanese				Displaced Syrians				Palestine Refugees from Syria (PRS)				Palestine Refugees in Lebanon (PRL)			
Baseline	Target 2018	Target 2019	Target 2020	Baseline	Target 2018	Target 2019	Target 2020	Baseline	Target 2018	Target 2019	Target 2020	Baseline	Target 2018	Target 2019	Target 2020