



LEBANESE REPUBLIC
MINISTRY OF ENERGY
AND WATER

Updated Policy Paper for the Electricity Sector

Ministry of Energy and Water
March 2019

1. Executive Summary

The Policy Paper for the Electricity Sector that was endorsed by the Council of Ministers in 2010 depicted the necessary initiatives needed to reform the Lebanese Electricity Sector in order to ensure a reliable electricity supply and quality of service while ensuring a balance in the sector's fiscal budget and the elimination of its deficit.

The financial deficit of the Electric Utility EDL - Electricité Du Liban reached 1.8 billion \$ in 2018. Many factors contributed to this situation; including: The freezing of the tariff at a level below the average cost of production, the operation of old power plants having low efficiencies and high operating costs, 16% technical losses, 21% non-technical losses and the burden of the Syrian refugees whose consumption has been estimated to be around 500 MW. All these factors, and the prevalence of many of these for the past 25 years, resulted in a cumulative debt of 30 billion \$.

Regarding EDL's financial deficit, most of the financial contribution made by the Government of Lebanon – GoL to EDL is being used to purchase fuel and cover for both tariff subsidy and electricity consumption of public sector establishments.

Against this background, the Ministry of Energy and Water – MoEW has been working in cooperation with the World Bank on updating the Electricity Policy Paper to achieve two main targets of reducing EDL's financial deficit and improving the electricity supply. These will be achieved in the short & long term through fast track public & transparent tenders that will be launched for the supply of electricity in partnership with the private sector at competitive prices with minimal environmental impact.

The proposed solution integrates three ingredients that shall be worked upon in parallel:

- 1- Decrease of the technical and non-technical losses along with the collection improvement.
- 2- Increase the generation capacity, improve efficiency and reduce fuel cost by using Natural Gas – NG.

3- Increase the tariff.

The plan will adopt the highest standards for transparency and competitiveness using an international bidding process that will ensure a fast supply of clean electricity at competitive prices. For this purpose, a temporary short term solution and a permanent long term solution will be merged into a single transaction.

Hence, the proposed solution shall incorporate both the short term and the long term components in addition to the three ingredients of the integrated solution which are: the generation plan and technology, the fuel sourcing strategy and the type of fuel used, in addition to strengthening the grid at the proposed sites. The Ministry of Energy & Water has the sole prerogative of moving forward with the short term solution or the long term solution or with both together, in addition to adopting some of the solution ingredients or altogether.

Starting in 2020, temporary power plants of 1,450 MW generation capacity will be deployed for a period ranging between 3 to 5 years. These plants shall be added to specific sites suitable for fast power evacuation as shown in the table below. In parallel to the above, permanent plants will be constructed at the sites of Selaata, Zahrani and Hrayche.

Electricity generation required in the short and long terms with corresponding works on the transmission grid

Site		Deir Ammar	Zahrani	Selaata	Hrayche	Zouk	Jieh	Tyre
Generation	Existing (MW)	455	455		35	250	180	70
	Short Term (MW)	450	700			100	200	
	Long Term (MW)	550	550	550	300	550	550	70
Transmission	Short Term	U/G cables with mobile S/S 220kV/MV	MV Mobile S/S			MV MobileS/ S	MV Mobile S/S	
	Long Term	220kV Double circuit OHTL to Ksara	220 kV OHTL Zahrani-Nabatieh & Zahrani-Aramoun	220 kV OHTL to Halat	Connecting to the 220kV grid in Bahsas	Transm. sector Master Plan	Transm. sector Master Plan	Transm. sector Master Plan

Although the currently available fuels in Lebanon are Diesel Oil – DO and Heavy Fuel Oil – HFO, the bids will be open for proposals using other types of fuels provided they are supplied by the bidder. The old plants of Zouk, Jiyeh and Hrayche will also be decommissioned starting from 2020 as a preamble for their replacement at the same sites by modern, cost-effective, efficient and environmental friendly power plants.

In parallel, an FSRU procurement process is currently underway with the goal of securing the Natural Gas – NG by 2021 which will contribute in mitigating the environmental impact of the power plants and result, in principle, in reducing the operating costs.

In addition to the above, the renewable energies will be playing a major role in the coming period as more than 840 MW of Solar PV plants and 600 MW of Wind power plants are planned for construction.

In this context, a new plan for the renewable energies for the coming periods is currently under development in collaboration with IRENA with a goal of specifying the optimal mix of renewable technologies to be deployed in order to achieve the target of 30% of the consumed energy by 2030 from renewable energies.

During the same period, all the initiatives of the Transmission Master Plan endorsed by the CoM in 2017 shall be executed to address grid bottlenecks and enable energy evacuation.

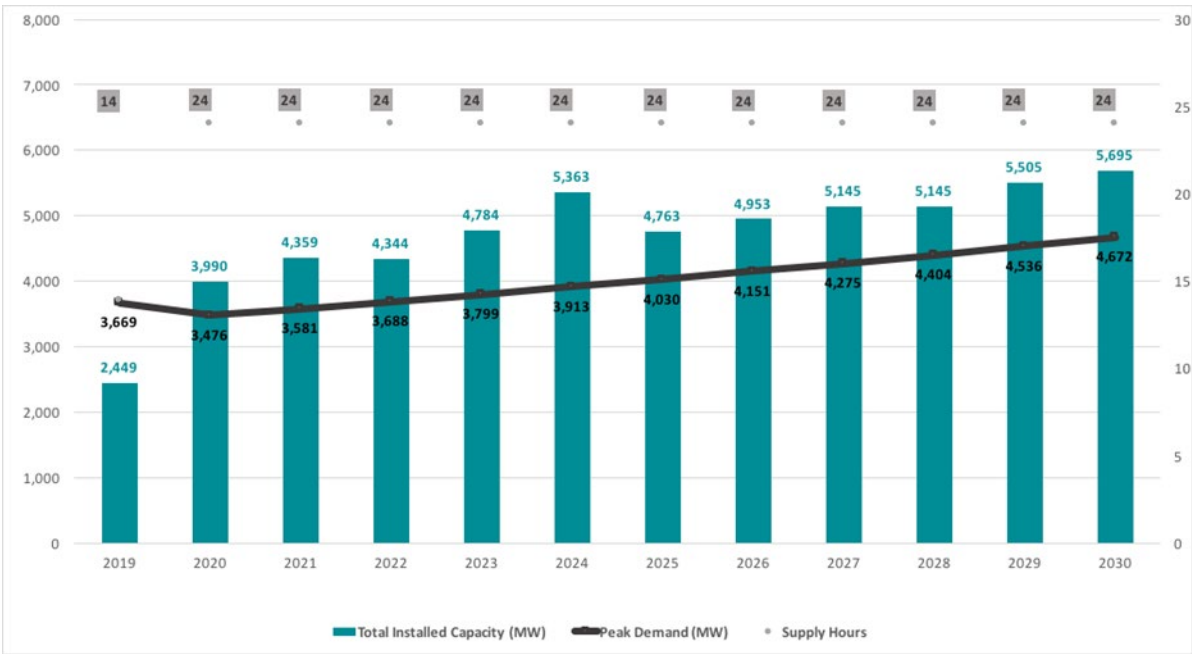
In parallel with the above, 1,200 billion LBP will be saved between 2019 and 2026 by decreasing the overall losses from 34% to 11%, 555 billion LBP will be raised by activating the bill collection process, and 444 billion LBP plus 1,820 billion LBP of arrears will be collected from the Palestinian camps, the public administration and the water establishments, respectively.

The implementation of all the above projects under the current tariff structure will surely result in an additional EDL deficit. It is therefore necessary to increase the EDL tariff by 2020 to eliminate its deficit. It is worth noting that such a tariff increase will result in a net decrease of the overall electricity bill that citizens are paying because of the anticipated timely decrease of their private generator bills during the same period. In that respect, the Ministry of Energy and Water is currently preparing a tariff study in collaboration with the World Bank with an objective to minimize the effect of the tariff increase on the low consumption subscribers.

The generation plan calls for the addition of two new permanent power plants having a total capacity of 1,100 MW while the temporary power plants are gradually removed between 2023 and 2025. Furthermore, the plan calls for the removal of the existing old plants at Zouk, Jiyeh and Hrayche as a prelude for their replacement with new power plants. Needless to say that the development of new plants in a continuous way is necessary to accommodate the natural increase in the

electricity demand at an approximate pace of one 600 MW power plant every 5 years.

Similarly, the second phase of the transmission projects needed to expand and stabilize the grid till 2030 will be executed as specified in the transmission master plan.



Generation increase plan 2020-2030

2019

- | Initiate implementation works on Deir Ammar 2 power plant
- | Reduce technical and non-technical losses on the network
- | Collecting the arrears of the Palestinian Refugees' camps, public institutions and water establishments
- | Initiate smart meters' installation and control center set up

2020

- | Installation of 1,450 MW temporary power in different locations
- | Installation of 180 MW solar PV
- | Installation of 220 MW wind power
- | Disconnection of Hraishe thermal power plant and its replacement with a new plant

2021

- | Connection to the grid of OCGT 360 MW Deir Ammar 2 plant
- | Implementation of LNG FSRUs in Deir Ammar, Salaata and Zahrani

2022

- | Disconnection of existing 370 MW power barges from the grid
- | Connection to the grid of the 550 MW CCGT Deir Ammar 2 power plant
- | Connection to the grid of the 360 MW OCGT Zahrani 2 power plant
- | Connection to the grid of the 360 MW OCGT Salaata 1 power plant
- | Disconnection of Zouk and Jiyeh power plants and their replacement with new plants
- | Installation of 300 MW solar PV with 210 MWh of storage capacity

2023

- | Connection to the grid of the 550 MW CCGT Zahrani 2 power plant
- | Connection to the grid of the 550 MW CCGT Salaata 1 power plant
- | Installation of 400 MW wind power

2024

- | Connection to the grid of the 360 MW OCGT Zouk power plant
- | Connection to the grid of the new 300 MW Hraishe thermal power plant

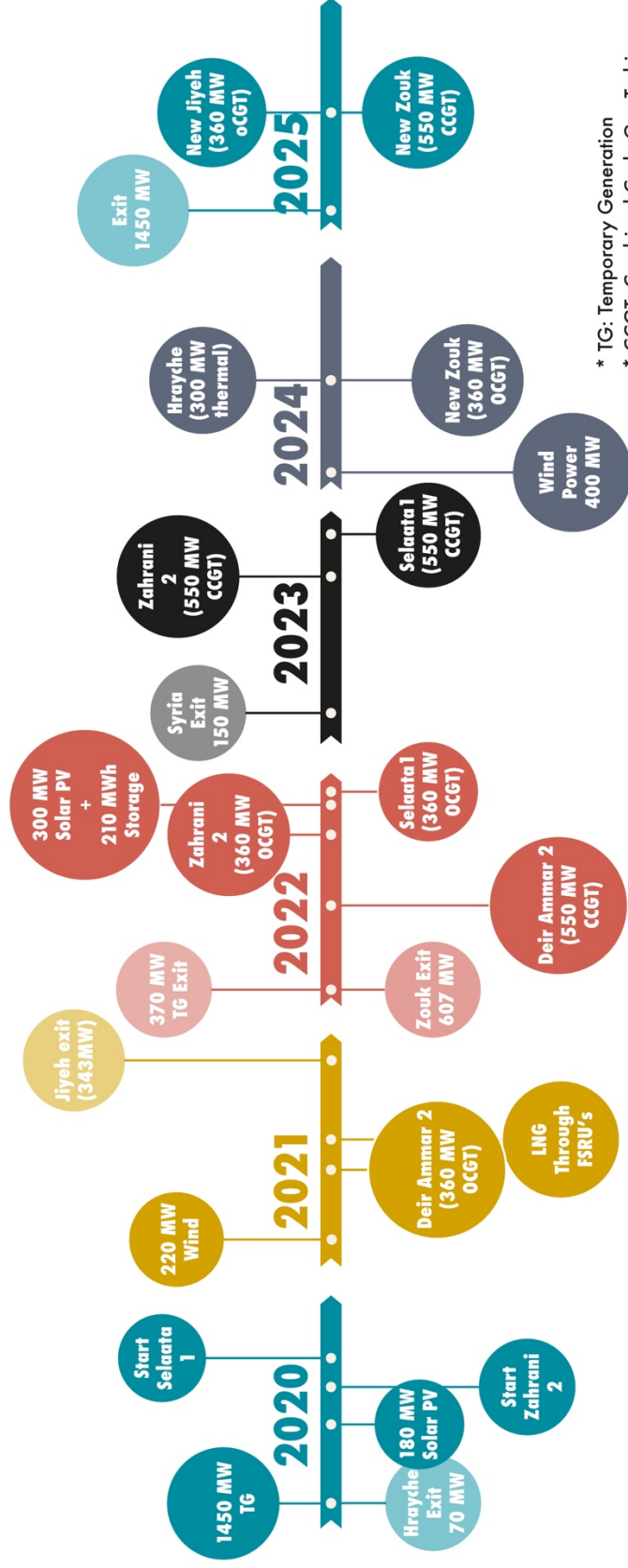
2025

- | Connection to the grid of the 360 MW OCGT Jiyeh power plant
- | Disconnection of the 1,450 MW temporary power generation
- | Connection to the grid of the 550 MW CCGT Zouk power plant

2026

- | Connection to the grid of the 550 MW CCGT Jiyeh power plant

* CCGT: Combined Cycle Gas Turbine | * OCGT: Open Cycle Gas Turbine



- * TG: Temporary Generation
- * CCGT: Combined Cycle Gas Turbine
- * OCGT: Open Cycle Gas Turbine

2. Introduction

The financial deficit of the Electric Utility EDL - Electricité Du Liban reached 1.8 billion \$ in 2018 and a cumulative amount of 30 billion \$ for the last 25 years.

In view of the above reality, the Ministry of Energy & Water has been seeking optimal technical, financial and political solutions to promptly reduce the financial deficit in compliance with the requirements of the Policy Paper for the Electricity Sector endorsed by the Council of Minister's decision No.1 dated 21/6/2010 which constitutes the general framework for the Electricity Sector in Lebanon.

At the same time and in order to benefit from the financial pledges committed for the energy sector in the CEDRE conference, the Ministry of Energy & Water and the World Bank have been collaborating during the year 2018 to prepare the needed studies on the Lebanese energy sector which lead to the issuance of a series of recommendations to update the of initiatives proposed in the Policy Paper of 2010 with a view to remedy the sector crisis taking into consideration the current situation and the initiatives that were executed since 2010.

Endorsement of the Government to these recommendations as presented and the commitment to implement them in a timely manner in line with the proposed time schedule is essential to remedy the crisis and decrease the deficit with a view to eliminate it.

3. Current situation of the electricity sector

The Electricity Sector is costing the treasury between 1.5 and 2 billion \$ annually for the following reasons:

- 1- **Freezing of the Tariff** since 1994 at an average of 138 L.L. per kWh when the price of crude oil didn't exceed 20\$ per barrel noting that this price exceeded 71\$ for the year 2018 and is expected to be 66\$ for 2019. The difference in the price of crude oil increases the cost of electricity production and the magnitude of support needed for the electrical utility.
- 2- **High Operational Costs** based on Heavy Fuel Oil – HFO & Diesel Oil – DO leading to a production cost that is among the highest worldwide knowing that some of the existing plants were designed to run on Natural Gas – NG.
- 3- **Low Efficiency Old Plants** with continuous costly maintenance & low energy output.

- 4- **High Technical Losses** on the transmission & distribution grids reaching up to 16.5% despite the investments made regularly by the Ministry of Energy & Water, EDL and the Distribution Service Providers – DSP’s in rehabilitating & upgrading the grids.
- 5- **High Non-Technical Losses** reaching 21% due to the illegal connections on the distribution networks and the inability of the DSP’s to remove these.
- 6- **Non-Collected Bills** reaching 5% including the arrears (except for the period of strikes that delayed further the collection and increased the non-collected bills percentage till 30%).
- 7- **The Effect of the Syrian Refugees** whose electricity consumption has been estimated to be around 500 MW, causing 275 Million \$ of additional costs on EDL and depriving the Lebanese customers from 5 additional hours of supply at peak times. The cost of this problem has been estimated to be 150 Million \$ annually in private generator bills (LCRP 2017 – 2020, UNDP Study 2016).

4. Quick overview of executed projects

Notwithstanding the political, financial & administrative obstacles that hindered the completion of the “Policy Paper for the Electricity Sector -2010” initiatives (Annex No.1), between 2010 & 2018, the Ministry of Energy & Water completed a number of Electricity Projects (Annex No.2) and started numerous others that are still in various stages of execution, tendering or evaluation.

The executed projects contributed in maintaining the level of supply despite the natural increase in demand and the further increase caused by the Syrian refugees since 2013 as shown in the graph here below.

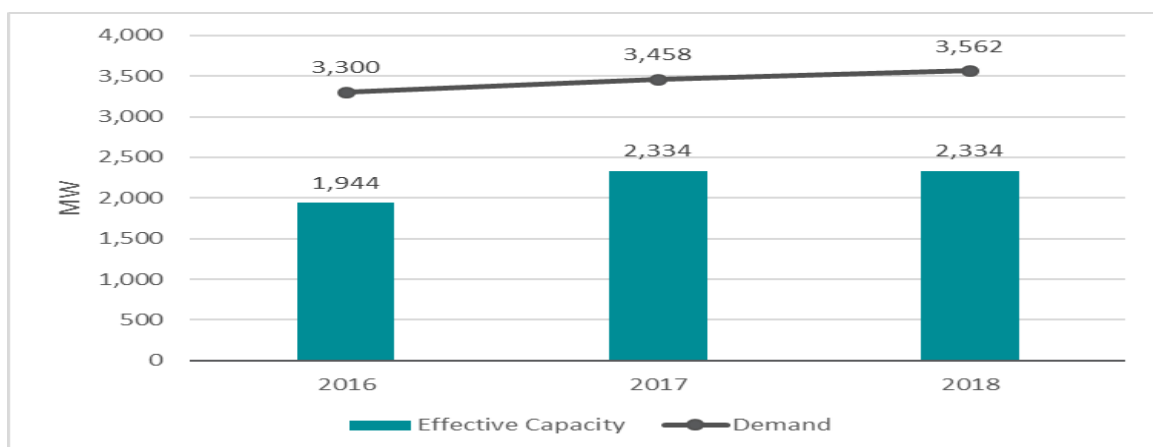


Figure 1: Production and Electrical Demand 2016-2018

The following Table No.1 shows the generating capacity and cost of production of the existing plants.

Table 1: Generation capacity and costs of existing power plants.

Name of the Facility	Fuel Type	Installed Capacity	effective Capacity 2018	Total Cost (c\$) with average Barrel cost:
		(MW)	(MW)	\$71
Existing EDL				2018
Zouk 1 Thermal Power Plant	HFO	607	440	14.75
Jieh 1 Thermal Power Plant	HFO	343	180	19.39
Zouk 2 ICE Power Plant	HFO/NG-Z	198	157	10.83
Jieh 2 ICE Power Plant	HFO/NG-J	78	63	11.19
Zahrani I CCPP	DO/NG-ZAH	469	420	13.62
Deir Ammar I CCPP	DO/NG-DA	464	430	14.96
Baalbeck Open Cycle GT	DO	64	57	20.26
Tyr Open Cycle GT	DO	72	56	21.44
Richmaya-Safa Hydro	-	13	3	3.66
Naameh (Landfill Gas)	-	7	7	1.00
Existing Barges				
Power Barge Zouk	HFO/NG-Z	187	195	13.95
Power Barge Jiyeh	HFO/NG-J	187	195	14.03
Existing IPP's				
Litani Hydro	-	199	47	3.97
Nahr Ibrahim Hydro	-	32	17	2.65
Bared Hydro	-	17	6	2.65
Kadisha Hydro	-	21	15	2.65
Hrayche Thermal Power Plant	HFO	35	46	20.13
Power Wheeling				
Imports from Syria	Syria	276	69	15.35

As for Renewable Energies, more than 45 MW of distributed PV have been commissioned and the Power Purchase Agreements for 220 MW of Wind Farms have been signed with three developers. The bids for 12 PV Farms each with a capacity of 10 to 15 MW and distributed across the country have been received, and the call for the Expression Of Interests – EOI for the following projects were launched:

- Three PV Farms with a capacity of 100 MW each and storage capacity above 70 MWh.

- Wind Farms with capacity between 200 and 400 MW.
- Hydro Electric Plants on various Lebanese rivers.

Regarding the transmission & distribution networks, most of the initiatives that were listed under the emergency plan approved under Law 181/2011 have been completed. These initiatives/projects have contributed to the enhancement of generation evacuation and grid stability.

The DSP's have also completed a number of projects that contributed to a decrease in grid losses and improvement in customers services. Notwithstanding these projects, the grid losses were still high at the beginning of 2019 as shown here below:

Table 2: Percentage of technical and non-technical losses on transmission and distribution networks

Technical losses on the transmission network	4%
Technical losses on the distribution network	13%
Non-technical losses on the distribution network	21%
Total losses	34%

5. Objectives of the updated electricity sector reform paper (2019-2015)

The updated Policy Paper for the Electricity Sector has the following three objectives that need to be implemented simultaneously in order to reduce the deficit:

- 1- Reduction of the Technical & Non-Technical Losses** from 34% at the beginning of 2019 to 12% at the end of 2021 through the implementation of the transmission & distribution initiatives and the resolution of the non-technical losses.
- 2- Improvement of the Generation System** in terms of efficiency & type of fuel used, replacement of old plants by new ones and the conversion to Natural Gas – NG.
- 3- Increase the Tariff** to cover the cost of generation, transmission & distribution including the expected additional generation for the next five years.

In order to understand the impact of these objectives on the technical and financial health of EDL, the following indicative numbers are used:

- A reduction in grid losses (technical or non-technical) of 1% increases EDL revenues by about 20 billion LBP.
- Based on the current EDL tariff and a crude oil price of 66\$ per barrel, an increase of generation capacity of 100 MW will increase the deficit by 60 Million \$ despite the related decrease in the average generation cost.
- A tariff increase of 1 \$cent per kWh will decrease the deficit by 100 million \$.

Based on the two main goals of this plan; namely, quick reduction of the financial deficit of EDL and improvement of the electricity supply, it is imperative to work on the above three objectives simultaneously; i.e., losses, cost of generation and tariff in order to reach a balance between the EDL costs and revenues as shown here below:

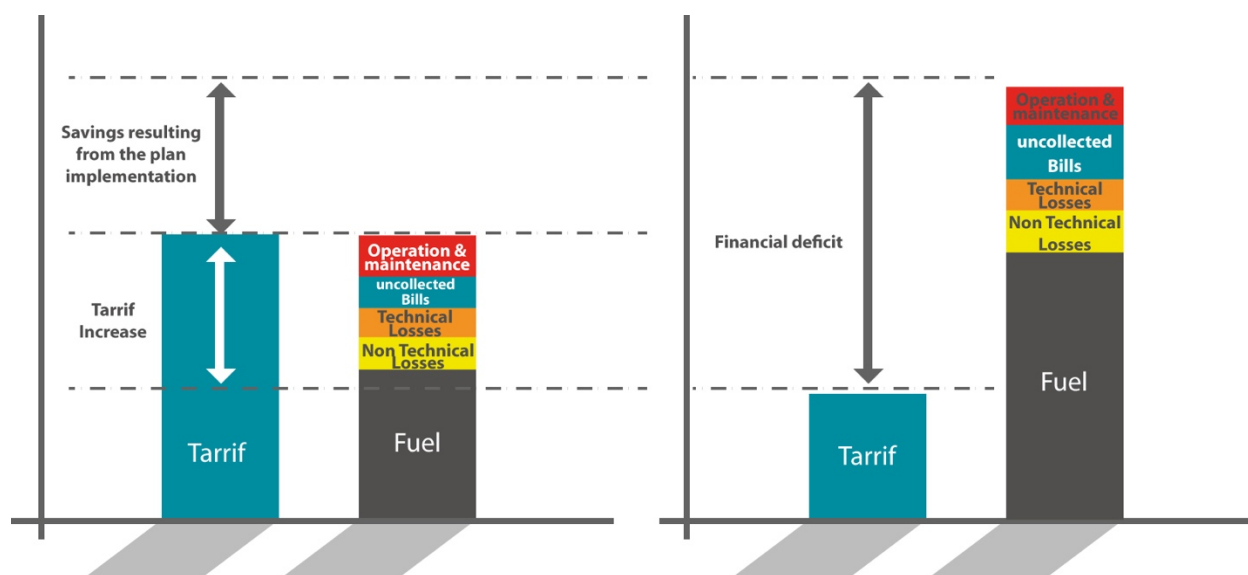


Figure 2: the three components of the deficit (losses, cost of generation, tariff)

6. Action Steps of the updated electricity sector reform paper (2019-2015)

This section presents the action steps proposed by the Ministry of Energy & Water to achieve the goals and objectives of the updated electricity sector reform paper in the initial phase:

a- Increase of Generation Capacity:

The generation plan aims to increase the capacity to meet total demand for electricity by EDL and hence eliminate the need for private diesel generation by 2020.

The resulting evolution of generating capacity and peak demand for the period extending from 2019 until 2030 is depicted in the following graph in which a yearly increase of 3% in peak demand can be estimated for 2020 where the peak is 3780 MW. However according to a World Bank estimation, the 24/24 electricity supply and the tariff increase are expected to decrease that demand by 8%. Therefore, the peak demand during the same year will become 3476 MW. To meet that demand based on the 2020 estimated technical losses of 10.5%, the generation capacity should at least be 3884 MW plus an additional margin for operating reserves.

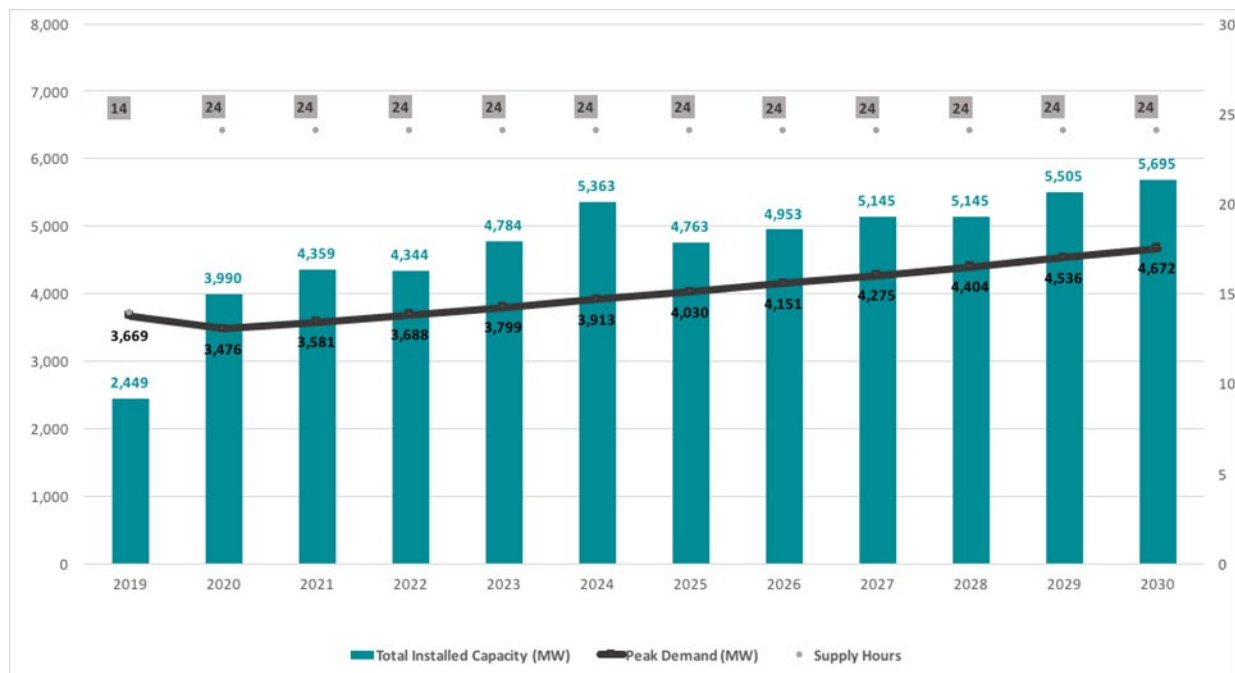


Figure 3: 2019-2030 Generation increase plan

Based on the 2019 available generation capacity, 1450 MW of additional capacity should be added in the short term at specific locations suitable for the prompt evacuation of the additional energy. The following table shows some of the proposed sites. In parallel, permanent power plants will be developed at the sites of Selaata, Zahrani and Hrayche.

Table 3: Short and long-term electricity generation with corresponding works on the transmission network

	Site	Deir Ammar	Zahrani	Selaata	Hrayche	Zouk	Jieh	Tyre
Generation	Existing (MW)	455	455		35	250	180	70
	Short Term (MW)	450	700			100	200	
	Long Term (MW)	550	550	550	300	550	550	70
Transmission	Short Term	U/G cables with mobile S/S 220kV/MV	MV Mobile S/S			MV MobileS/ S	MV Mobile S/S	
	Long Term	220kV Double circuit OHTL to Ksara	220 kV OHTL Zahrani-Nabatieh & Zahrani-Aramoun	220 kV OHTL to Halat	Connecting to the 220kV grid in Bahsas	Transm. sector Master Plan	Transm. sector Master Plan	Transm. sector Master Plan

The possible solutions incorporate three components which are the generation plan and technology, the fuel sourcing strategy and the type of fuel, in addition to strengthening the grid at the proposed sites.

The plan does not impose any constraints on generation technologies, sites proposed in this plan or any other suitable ones as long as energy evacuation is possible. Furthermore, the choice of fuel for the power plants remains open in order to secure the best prices and the highest levels of transparency and competitiveness.

In view of securing effectiveness & speed in reaching the target, the short-term generation will be evacuated through temporary high voltage facilities (i.e. as mobile substations) or permanent ones provided these are included in the transmission master plan. As for the long term, the transmission master plan initiatives will be implemented in a timely manner for the generation evacuation in compliance with the specifications and the transmission facilities locations specified by the Ministry of Energy & Water under Annex No.5.

In order to maintain a balance between the generation available and the demand for electricity, an investment in the construction of 3100 MW of new permanent power plants is needed. Therefore, following the execution of the Deir Ammar II CCPP project, two new power plants at Zahrani & Selaata will be constructed and

the existing plants of Zouk, Jiyeh and Hrayche will be replaced by new plants at the same sites.

Hence, the proposed solution shall incorporate both the short term and the long term components in addition to the three ingredients of the integrated solution which are: the generation plan and technology, the fuel sourcing strategy and the type of fuel used, in addition to strengthening the grid at the proposed sites. The Ministry of Energy & Water has the sole prerogative of moving forward with the short term solution or the long term solution or with both together, in addition to adopting some of the solution ingredients or altogether.

The timeline for the execution of the additional generation plan is shown in the following graph No.4. In that respect the short-term solutions will be based on temporary generation facilities whereas the long term solutions will be based on permanent generation facilities while leaving the door open for different technologies for the short term and the long term or technologies that can cover both the short and long term.

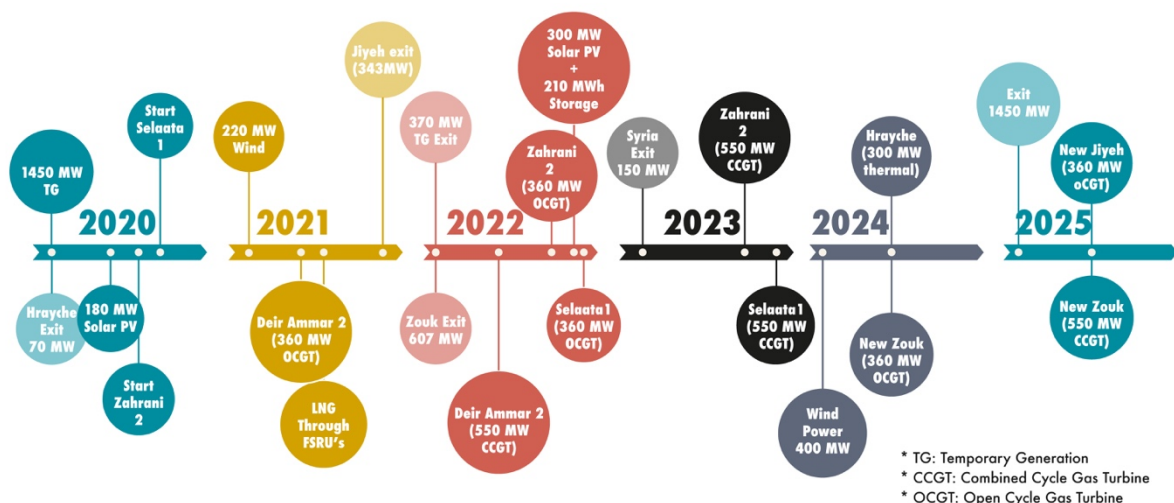


Figure 4: Plan for increasing production

It is worth noting that these projects will be implemented in a timely manner together with the grid reinforcement initiatives and the tariff increase as detailed later in this document.

a. Transmission:

The grid reinforcement needed for the accommodation of the planned additional generation entails the closing of the Mansourieh loop, the completion of the Bikfaya-Faytroun-Halate line in the Jouret Badran area, the Bared-Halba line, the Kobayat-Hermel line and the Sour-Wadi Jilo line. In addition, completion of the Beirut northern loop and the first part of the Beirut southern loop along with other projects are foreseen as shown under Annex No.6. These projects which are all part of the Transmission Master Plan endorsed by the CoM in 2017 will significantly contribute to lowering the technical losses (currently 4%) on the transmission grid and subsequently increasing the revenues of EDL (Annex No.5).

b. Distribution:

As noted earlier, any plan for the resolution of the electricity crisis shall start by decreasing the losses which can generate significant revenues to EDL. Upon launching of the DSP projects in April 2012, the Electricity Sector experienced reduction in losses and improvements in the collection. This project has been the first public private partnership in Lebanon with a clear objective of fixing and upgrading the distribution network through investments for the implementation of a smart grid, the collection improvement, the reduction of technical and non-technical losses and improvement in customer service (See Annex No.6 for Plan Details).

The implementation of the DSP project has faced a series of challenges that hindered its implementation as follows:

- The daily workers & electricity bills collectors strike in 2012 and 2014 for more than 8 months.
- The displacement of the Syrian refugees with the related illegal connections in the absence of law enforcement.
- Security & instability issues in parts of the South, the Bekaa and the North regions.

The attached Annex No.6 – Document No.1 shows in detail the effect of the strikes on the DSP project implementation.

In this context, as an addendum to the implementation of the 2010 Policy Paper for the Electricity Sector, EDL & the DSPs have elaborated a plan of action as follows:

Reduction of Losses:

- Organization of a National campaign on all the Lebanese territories in collaboration with the concerned parties from the Ministry of Interior, the Ministry of Defense, the Lebanese Army and the Ministry of Justice, for the removal of the illegal grid connections, the issuance of infringement notices and the quick processing of the claims for theft of electricity by the competent judiciary units (Attached Annex No.6 – Documents No.2, 3 & 4).
- The completion of the distribution projects and the smart grid for the reduction of losses and the control of billing and collection (Attached Annex No.6 – Documents No.5, 6 & 10).
- The reduction of the technical & non-technical losses by 22% on average (from 34% to 12%) by the end of 2021 as follows:

Table 4: Reduction of technical and non-technical losses

Year	2018	2019	2020	2021	Total (2019-2021)
Total losses (technical & non-technical) %	34	25	17	12	-
Additional income due to losses' reduction (Billion LBP)*	-	180	340	440	960

*Calculated based on the current average tariff of 138 LBP/kWh and electricity production of 2018.

It should be noted that the above strategy has been developed till 2021 which is the expected date of completing the rollout of smart meters on almost the entire Lebanese territory. This will allow EDL to develop a detailed plan to reduce losses based on information collected by the smart meters (Attached Annex No.6 – Document No.4).

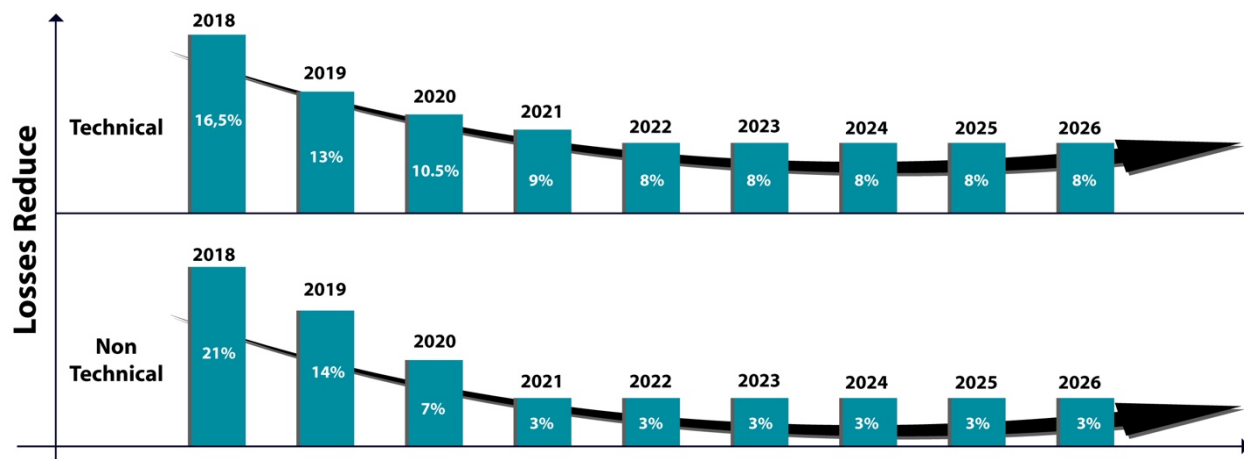
In order to reduce the overall share of losses, investments should be made in the development of both the transmission and distribution networks, construction of substations, removal of illegal connections and the collection of arrears from the public establishments and the Palestinian camps leading to the generation of EDL revenues exceeding 2 Billion \$, This will entail speedy expropriations processes for the substations and overhead lines .

The following timetable shows the reduction of losses between 2018 and 2025 which is expected to become around 12% starting from 2021. This loss reduction plan shall be the starting point of the policy.

Table 5: Proposed time plan to reduce technical and non-technical losses

	2018	2019	2020	2021	2022	2023	2024	2025
Technical losses on the transmission network	4%	3.5%	3.5%	3.5%	3%	3%	3%	3%
Technical losses on the distribution network	13%	9.8%	7.2%	6%	5%	5%	5%	5%
Non-Technical losses on the distribution network	21%	14%	7%	3%	3%	3%	3%	3%
Total losses	34%	25%	17%	12%	11%	11%	11%	11%

Figure 5: Plan to Reduce Technical and Non-Technical Waste



Improve bill collection:

Improving bill collection with DSPs by implementing the 2019 collection plan which entails mechanisms for collection & issuance of consumers bills.

Table 6: Amelioration of bill collection

DSP	Date for monthly billing
BUS	Reaching monthly billing by April 2019 in all departments
KVA	Reaching monthly billing by 2020 in Beirut and Bekaa (except for the department of Rachaya expected in October 2020)
NEUC	Reaching monthly billing by 2020
MRAD	Reaching monthly billing by 2020

The success of this plan hinges on the following:

- Collaboration of citizens in the payment of the proposed bills for clearing out the period of delays.
- Collaboration & commitment of all political parties in supporting the collection plan and ensuring the appropriate climate for the understanding by the citizens of the importance of paying in a timely manner the proposed bills. The latter will be in conjunction with an EDL/DSPs advertising campaign entailing the interaction with the people to clarify the aim of these measures.
- The commitment by the DSPs & EDL for the proposed plan, the provision of the necessary support and the implementation of the necessary measures for ensuring its success (See attached Annex No.6 – Document No.6).

Collection of Arrears:

The collection of arrears in 2018 amounted to 19 billion LBP in revenues. Therefore, it is expected that with a 30% yearly increase, revenues of 120 billion LBP could be achieved over four years as shown in the following table:

Table 7: Collection of Payment Arrears

Year	2018	2019	2020	2021	Total
Arrears' payment income (Billion LBP)	19	25	33	43	120

As for the arrears of the public establishments and public administrations, EDL needs a Council of Ministers decision compelling them to honor their dues. The arrears owed by Palestinian camps need to be accommodated as well, and the cost of electricity consumed by Syrian refugee's should be committed for by the international donors (Lebanon Crisis Response Plan – LCRP – Energy Sector).

Table 8: Bill collection acceleration Plan 2019-2025

Steps	Amount (Billion LBP)
Amelioration of arrears' collection	273
Amelioration of bills' collection to attain monthly billing	555
Nothern Mount Lebanon – North Lebanon Akkar	(29)
Southern Mount Lebanon – Chiyah	(280)
South Lebanon	(78)
Beirut and Bekaa	(168)
Palestinian refugees' camps	444
Public administration and water establishments' dues	1,820
Total	3,092

(Annex No.6, Document No. 7).

The following table shows the collection improvement timeline from 2019 till 2025.

Table 9: Time Plan to Improve Bills' Collection and Arrears' Payment

(Billion LBP)	2019	2020	2021	2022	2023	2024	2025	Total
Public institutions, Water establishment and Palestinians' camps dues	0	453	453	453	453	453	0	2,264

Amelioration and acceleration of bills' collection	255	300	0	0	0	0	0	555
Income from arrears' collection	25	33	43	43	43	43	43	273
Total	280	786	496	496	496	496	43	3,092

The above revenues can only be achieved through a clear political decision backed by the accompaniment of security forces on the ground to remove illegal connections on the grid and collecting the arrears. The dues of the public administrations, the water establishments and the Palestinian camps have reached 2264 billion LBP which can be paid back over five years through yearly installments of 453 billion LBP. The collection can also be accelerated to reach a uniform level of monthly bills issuance in all regions thereby resulting in 555 billion LBP of revenues in 2020.

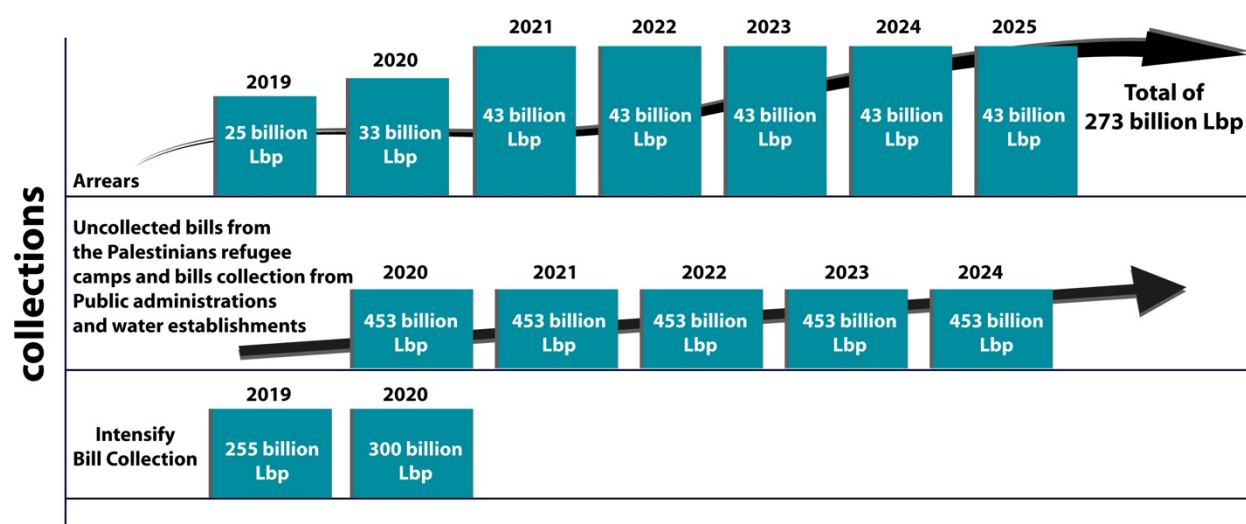


Figure 6: Plan to increase EDL's Revenues

Actions needed to enhance the implementation of the DSPs Project:

Collection:

- Timely payment of EDL dues by the public administrations and the refugee's camps.
- EDL implementation of measures giving incentives for the citizens for paying their arrears and gradual penalties in relation to the amount and the delay

period in case of default, in addition to temporary reductions in the meter's application fees for the residential low consumers.

Losses reduction:

- The organization of a National campaign for the removal of the illegal connections to the grid accompanied with the support of the necessary security forces and the activation of the judiciary measures in case of infringement.

The structure:

- Transferring all the distribution services to the DSPs through the modification of the current work mechanisms.

The smart grid:

- The necessity to complete all the phases of the smart grid project.

The contract:

- The enhancement of the DSPs autonomy through the approval of all the necessary measures for their work effectiveness.

Completing electricity distribution's projects:

- The completion of all phases of the DSPs projects particularly the smart grid for the losses and billing mistakes limiting along with the collection improvement.
- The finalization of the DSP Supervision bidding process.
- The nomination of a technical consultant for EDL assistance in the Program Management.
- The setting up of a monitoring & control center for the meters remote control and the proper management of supply & demand.

Table 10: Completing Distribution Projects

Description	Source of financing	Period		Budget (Million USD)
DSP Project	Lebanese government/ EDL	2018	2021	906

Program Management	Lebanese government/ EDL	2019	2021	10
Works' Supervision	Lebanese government/ EDL	2019	2021	35

Table 11: Projects of remote reading, monitoring and control of the electric meters

Description	Source of financing	Period		Budget (Million USD)
HES	Lebanese government/ EDL	2019	2020	2
AMI Center	Lebanese government/ EDL	2020	2021	15

c. Natural gas

The use of Natural Gas for energy generation is the key for the strategic transformation of the sector through the improvement of efficiency of the new and existing plants which will translate into treasury savings in the hundreds of millions of dollars in addition to the significant decreases in plants' emissions.

The fuel diversification will occur through the deployment of Liquid Natural Gas - LNG Floating Storage Regasification Units (FSRU). The procurement of the FSRUs has reached the bids evaluation stage as the Ministry of Energy & Water is currently evaluating the technical offers with the assistance of Poten & Partners to be followed by the financial evaluation and the bid evaluation final report submittal to the Council of Ministers for approval in line with the policy timeline. The Ministry expects the first NG delivery to occur within the first quarter of 2021.

On different front, the Ministry is negotiating with the Egyptian government the possibility of resuming the NG supply through the Arabic gasyle pipeline.

d. Tariff increase

The implementation of the above projects under the current tariff structure will result in additional EDL deficit because the tariff having been frozen since 1994. It

is therefore absolutely necessary to increase the EDL tariff by 2020 in order to eliminate the deficit.

It is worth noting that a tariff increase will result in a reduction of the overall electricity bill that the citizens are currently paying for both EDL and the private generators.

In that respect, the Ministry of Energy and Water is currently preparing a tariff study in collaboration with the World Bank with an objective to minimize the effect of the tariff increase on the low consumption subscribers. The new tariff will be indexed to oil prices so that neither EDL nor the treasury will face a financial deficit in case of a global rise in the oil prices.

Finally it is worth noting that the indirect costs on the Lebanese Economy resulting from the inability of EDL to supply energy continuously is equivalent to 4 billion \$ per year for each 1,000 MWh not supplied, as estimated by the World Bank and stated in the Policy Paper for the Electricity Sector. In addition, Lebanese consumers pay an additional cost of 1 billion \$ per year for private generators to partially satisfy their energy needs

Decisions taken by the Council of Ministers during the special meeting held in Baabda on 8/4/2019.

- The Ministry of Energy & Water commits for implementing the initiatives of the Policy Paper for the Electricity Sector endorsed by the Council of Ministers decision No.1 dated 21/6/2010 that were not addressed in the current policy update (e.g. to state only a few : energy efficiency, measurements and standards, EDL corporatization etc..).
- The Government endorses the objectives and goals of this policy update which are: reducing the deficit with the goal of eliminating it and achieving profit, decreasing the losses, increasing the generation capacity , Improving electricity supply and increasing tariff as per the specified timeline. To achieve the above, the Government shall facilitate the processes of public bids and expropriations, and the implementation of all the necessary measures for the facilitation and acceleration of the works at all the execution stages by all the relevant ministries.

In view of the above, the Council of Ministers decided the following:

a. Generation:

- The assignment of the Ministry of Energy & Water for the preparation of the tender documents for the construction of all the power plants with the assistance of international technical & legal consultants deemed appropriate by the Ministry.
- The undertaking of the bids proceedings through the Public Procurement Management Administration (PPMA) following the amendment of law 288/2014 as follows:

1- The ruling of law 288/2014 dated 30/4/2014 is extended for 3 years.

2-

2-A- Design, Finance, Build, Operate & Transfer power plants projects will be contracted under administrative, technical & financial terms that will be specified in detail in tender documents that will be prepared by the Ministry of Energy & Water.

2-B- An exception will be made for the Public Accountancy Law and all texts related to the principles of award that are not in accordance with the nature of the PPA contracts specified in the Terms of Reference.

Throughout the bidding process & at all the bidding stages, the Public Procurement Management Administration (PPMA) will be assisted by the working team of the Ministry of Energy & Water and who ever that Ministry deems appropriate.

- The assignment of a Ministerial Committee with the sole mission of ensuring the fast bids proceedings and addressing any issues that might delay the bidding process.
- The approval of the Generation plan for the construction of permanent environmentally friendly power plant as follows (2019-2015):
 - Selaata 1 (500 - 600 MW), Zahrani 2 (500 - 600 MW), Zouk (500 - 600 MW), Jiyeh (500 - 600 MW) and Hraycheh (300 - 350 MW) to be constructed in line with this policy time schedule.

- The securing of the financing for the necessary expropriations for the construction of Selaata 1 as a first step in accordance with the applicable laws & regulations. The cost of financing shall be borne by the developer or the financing institutions or the Lebanese government if possible.
- The approval of the Generation plan for the construction of temporary power plants including the related transmission works necessary for the energy evacuation as follows:
 - Zahrani (600 MW), Deir Ammar (450 MW), Jiyeh (200 MW) and Zouk (100 MW) in addition to the needs of the regions of Bint Jbeil (40 - 60 MW) and Jib Jenin (40 - 60 MW).

- The merging of the bidding of the temporary & permanent power plants into one transaction with one combined price covering the two phases as follows:

Zahrani permanent + Zahrani temporary + Bint Jbeil temporary + Jib Jenin temporary (550 MW permanent + 700 MW temporary).

Selaata 1 permanent + Deir Ammar temporary + temporary Zouk and temporary Jieh (550 MW permanent + 750 MW temporary).

With the possibility of redistributing the power capacity for technical reasons to be specified by the Ministry of Energy & Water.

- The deconstruction of the old plants of Zouk, Jiyeh & Hrayche and the prompt launching of bids for their replacement by new environmentally friendly plants in the same locations as follows:

Zouk (500 - 600 MW), Jieh (500 - 600 MW) and Hrayché (300 - 350 MW),

The same bidding procedure mechanisms stated here above will be used for these plants in such a way to undertake the works in parallel at all stages. An adequate set up shall be found for Tyre & Baalbeck power plants for minimizing their cost and operating these as needed.

a. Renewable energy:

- The assignment of the Ministry of Energy & Water for negotiating with the river concession owners for the implementation of the solutions proposed by the World Bank study in accordance with the applicable laws & regulations.
- The completion of the renewable energy bids of all types prepared by the Ministry of Energy & Water.

b. Transmission:

In view of reducing the losses from 34% till 25% at the end of 2019, and up to 12% at the end of 2021 along with the grid expansion and stabilization for the absorption of the planned new generation capacity, the Council of Ministers decided the following:

- To request for the internal security forces and the Lebanese army to allocate the necessary personnel for convoying the EDL teams in performing their missions more particularly on the following:
 - Complete the 220 KV loop at Mansourieh
 - Complete the 66 KV a loop (Bikfaya-Faytroun-Halat) in the region of Jouret Badran.
 - Complete the 66 KV loop between Kobeyate and Hermel and the Tyr-Wadi Jilo line.
 - Protect the main transmission substations from aggression.
- To secure in stages the main substations, overhead lines & underground cables financing for the years 2019 & 2010 through the international donors with the possibility of transferring funds from the generation to the transmission under law 181/2011 as shown in the below table:

Table 12: Overall Cost of Transmission Projects

Year	Overall Cost
2019	405 Billion LBP
2020	298 Billion LBP

- To finance the expropriations listed here below from the international donors or from the government:

Table 13: Overall cost of expropriations

Year	Overall Cost (Substations)	Overall Cost (Lines)
2019	17 Billion LBP	-
2020	79 Billion LBP	100 Billion LBP

- To allocate a real estate for the construction of the Furn El Chubbak 220 KV substation (Beirut North Loop).
- To allocate the real estates No. 456 and 452 of Tahwetat Al Ghadir expropriated by the Ministry of Public Works and located inside the airport premises near the existing 66 KV substation for the construction of the Airport 220 KV substation (Beirut South Loop).

c. Distribution:

In view of decreasing the losses from 34% till 25% by the end of 2019 and up to 12% by the end of 2021, regarding the technical losses the Council of Ministers decided to confirm the completion of all the distribution projects.

Regarding the non-technical losses, the Council of Ministers decided the following:

- To request the internal security to allocate the necessary personnel for conveying the EDL and DSPs teams in executing their missions and to request the Lebanese army to support the internal security forces as needed in view of removing the illegal connections from all the Lebanese territories.
- To request the Ministry of Justice to form a judiciary team with the mission of accelerating the processing of the complaints coming from EDL regarding the infringements on the EDL facilities and specially in case of recidivism bearing in mind that the infringement notices have a penal effect.
- To confirm the activation of the DSP project and the autonomy of their operations.

As for the collection, the Council of Ministers decided the following:

- The mandate the Minister of Energy & Water and the Minister of Finance for setting up a mechanism for the collection in installments of the public administrations, public establishments and municipalities arrears. These arrears are estimated to be 1820 billion LBP in accordance with Table No.9.
- To mandate the Prime Minister and the Minister of Foreign Affairs to intercede with the UNRWA and with the international donors for the collection of the Palestinian camps arrears estimated to be 444 billion LBP in accordance with Table No.9
- To mandate the Prime Minister and the Minister of Foreign Affairs to intercede with the international donors for assuming the burden of the Syrian refugee's electricity consumption costs.

d. Tarif Increase:

- To eliminate the deficit through the tariff increase in parallel with the increase of the electricity supply hours while indexing it with the oil prices and splitting it in accordance with the outcomes of the tariff study currently undergoing by the Ministry of Energy & Water and the World Bank.

e. Legal framework:

- The assignment of the Civil Service Council for the completion of the application of Law 287/2014 in all its parts.
- The approval of the request of the Minister of Energy & Water to nominate a new EDL board following the finalization of the candidate's dossiers.

7. Annexes

Annex No.1: Policy Paper for the Electricity Sector – June 2010

Annex No.2: Projects implemented between 2010 and 2018

Appendix No. 3: Letters from the Original Equipment Manufacturers to the MoEW

Annex No. 4: Information on available land for new power plants

Annex No. 5: Transmission Sector Projects for the First Stage (EDF report on the assimilation capacity of the transmission sector)

Annex No. 6: Distribution Sector Plan