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Statistics Division



الاستقوا
ESCWA

Technical assistance to Lebanon on improving energy statistics for sustainable development: Assessment mission report

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Executive summary

Energy is fundamental for socio-economic development, and energy-related public policies are an essential part in a country's path to sustainable development. Basing such policies on evidence ensures effectiveness and public support, and evidence in this case equates to accurate energy statistics. Moreover, following the international recommendations for energy statistics guarantees that quantities can be compared, and best cases can be replicated.

In the case of Lebanon, where exploration of oil and gas reserves is ongoing, without yet commercial production, the time is ripe for developing reliable official energy statistics complete enough to build an energy balance. The energy balance is a standard tool for energy planning and is the basis for the calculation of Sustainable Development Goal indicators 7.2.1 on renewable energy and 7.3.1 on energy efficiency, not to mention the calculation of energy-related CO₂ emissions.

On request from the Ministry of Energy and Water (MEW), the United Nations Statistics Division (UNSD) and the UN Economic and Social Commission for Western Asia (ESCWA) gathered together relevant stakeholders from the Lebanese administrations¹ to assess the current situation of energy statistics in Lebanon and to draft an action plan towards improving the national energy statistics and publishing energy balances.

It was found that Lebanon has already high-quality technical capacity in its administrations, access to valuable data sources, and adequate legal framework, but on the other hand needs to improve its institutional arrangements in order to centralize and coordinate energy data collection and compilation. The establishment of a formal working group with mandate from the pertinent administrations would greatly facilitate the inter-institutional cooperation and make the data flows easier.

However, even with the establishment of such a working group, the easy flow of data that it is supposed to facilitate will be impossible without an integrated energy information system. Since this information system is not in place in MEW, it should be developed.

With the available information, it is already possible in the short term to compile a first provisional energy balance. This provisional balance would need to rely on some indirect data and some estimates, while in the long term the establishment of an integrated data collection covering all needed information (filling current data gaps) would allow more accurate energy balances to be compiled. This desired data collection in the long-term will require additional data surveys, inclusion of additional questions to current surveys, adaptation of current data sources, and/or smart use of regulatory power to ensure data reporting.

While there are capacitated staff, the numbers may not be enough in certain administrations (for example, MEW and the Central Administration of Statistics – CAS) for the smooth work in energy statistics. Such administrations should assess long-term needs of new staff and of training.

In brief, the Lebanese administrations have the conditions to achieve and sustain the long-term goal of publishing accurate and frequent energy balances to inform policy and support energy planning. The roadmap laid out in the present report is not complicated, though some details may need careful consideration. In addition to some one-time expenses, such as for setting up an energy information system, a long-term budget to support this long-term goal needs to be ensured, so that additional human resources, surveys and other arrangements can be sustained.

¹ In addition to MEW, UNSD and ESCWA, participated in the event: Central Administration of Statistics, the Office of the President of the Council of Ministers, the Ministry of Environment, Electricité du Liban, Lebanese Petroleum Administration, Lebanese Center for Energy Conservation, UNDP and independent experts.



Table 1. Summary of high-priority recommendations

Lebanon

Action plan	Priority	Timeline
Legal framework and institutional arrangements		
A. Institutionalize an inter-agency coordinating mechanism headed by MEW and involving other relevant stakeholders: CAS, MoE, PCM, etc. building on the working group gathered by UN ESCWA and UNSD for the assessment of energy data in Lebanon.	Very high	Short term
B. Identify the institution that will centralize energy data processing and disseminate data. Assign responsibilities and rights (including data sharing) among and within stakeholders.	Very high	Short to medium term
C. Ensure a long-term budget for energy statistics.	High	Medium to long term
Energy balances compilation and dissemination		
D. Develop energy statistics and the national energy balance based on international standards to inform policy.	Very high	Short to medium term
E. Ensure sustainability and timeliness of producing the energy balances.	Very high	Medium to long term
F. Ensure capacity building in energy statistics and a well-functioning information system.	Very high	Medium to long term
G. Introduce a sustainable data collection to cover data gaps.	High	Medium term



1. Introduction

Background

Energy is fundamental for socio-economic development. The availability of and access to energy and energy sources is particularly essential to poverty reduction and further improvements in the standards of living. However, at the same time, with the constantly increasing demand for energy, there are growing concerns about the sustainability and reliability of the current production and consumption patterns and the impact of the use of fossil fuel on the environment.

Due to the critical role energy plays in socio-economic development, the availability of high-quality energy statistics has always been a matter of concern for the statistical community. The United Nations Statistical Commission has discussed issues relevant to energy statistics since its inception, and in 1976 agreed on the use of energy balances as the key instrument in the coordination of work on energy statistics and the provision of data in a suitable form for understanding and analysing the role of energy in the economy.

The United Nations Statistics Division (UNSD), as the secretariat of the Statistical Commission, has been involved in developing methodology, compiling and publishing country energy data and assisting countries to improve their energy information systems.

The United Nations Economic and Social Commission for Western Asia (ESCWA), among other objectives, supports economic and social development in member countries. The Statistics Division at ESCWA not only acts as a regional focal point for UNSD, other organizations and member States, but strives to improve the production and dissemination of high-quality socioeconomic statistics and indicators in the Arab region. It provides member States with support to strengthen their national statistical systems. As such, UNSD and the Statistics Division at ESCWA have held a number of joint events and projects, including in the area of energy statistics.

One of such joint projects is the Programme on Statistics and Data under the 10th Tranche of the United Nations Development Account (DA10), which aims at strengthening the capacity of developing countries to measure and monitor Sustainable Development Goal (SDG) indicators. The Programme's Environmental Pillar, which also covers energy statistics, has Lebanon as one its target countries.

Lebanon, through its Ministry of Energy and Water (MEW), has requested support in improving energy statistics and developing energy balances. SDG indicators 7.2.1 on renewable energy and 7.3.1 on energy efficiency can both be derived from a well-compiled energy balance that follows the International Recommendations for Energy Statistics (IRES). As such, the request falls within the scope of the DA10 Programme on Statistics and Data, and UNSD and ESCWA are glad to collaborate with Lebanon as part of the Programme. An assessment mission is being proposed as a starting point in this process.

Lebanon's energy strategy for demand and supply is at a turning point. Significant oil and gas resources are currently untapped. In 2010, the United States Geological Survey (USGS) estimated that 1.7 billion barrels of recoverable oil and 122 trillion cubic feet of recoverable natural gas may be found in the Levant Basin Province². This can provide Lebanon with energy for domestic consumption and for exports, increasing revenues and reducing large deficits of the government budget. On the other hand, the Lebanese Government's National Infrastructure Investment Program (CEDAR) is requested to do major reforms to obtain funding, among which

² Lebanon Economic Vision 2018



reform of its power sector, whose deficit amounted to \$ 1,295 billion in 2017, accounting for 2.4% of GDP³, and whose losses on the grid can amount to 40%.⁴ In this context, to guide energy and economic policies, information on supply of all kinds of energy products, transformation processes to secondary energy and end use consumption are crucial, through the compilation of annual energy balances.

Objectives

The objective of this assessment mission was to assist the General Directorate of Petroleum at the Ministry of Energy and Water in producing an action plan to improve Lebanon's energy statistics. This plan envisages as a final goal the regular publication of complete and high-quality national energy balances for Lebanon. Other government stakeholders, including the Central Administration of Statistics and other government agencies, were invited so that the collective national policy needs in this area were incorporated in the plan. Cooperation and coordination among agencies will be essential to improve Lebanon's energy statistics in a cost-efficient way.

Organization of the programme

The mission was organized over four days (2-5 July 2019), where most meeting took place in ESCWA headquarters. There was thorough discussion and brainstorming on how to meet Lebanon's energy statistics needs, with the programme of work organized around five themes:

- i. Knowing users and uses of energy statistics in Lebanon;
- ii. Identifying data gaps and possible additional data sources to fill such gaps;
- iii. Institutional cooperation (identifying coordinators, mechanisms, actors best suited for assuming specific responsibilities, etc.);
- iv. Compilation of energy balances, as well as indicators (energy SDG indicators therein contained) to serve applications and energy policy for sustainable development (including energy efficiency and CO₂ emissions); and
- v. Dissemination of energy statistics and energy balances.

Expected outcome

The tangible outcome of this mission is the present report, laying out an action plan for improvement of Lebanon's energy statistics. Meanwhile, the participants are expected to have gained: (i) an enhanced understanding of the all the actors involved and their data needs; (ii) knowledge of data gaps and the needs to modify current programmes to fill such gaps; (iii) improved inter-institutional relationships at a technical level; and (iv) enhanced comprehension of the possibilities of using the energy balance in sound policy making for sustainable development.

³ Summary of the electricity file in Lebanon. Alnahar Newspaper. March 7, 2018 20:10

⁴ Energy Procedia 19 (2012) 310 – 320



2. Energy statistics country profile

Legal framework

Central Administration of Statistics (CAS)

Two decrees provide CAS the legal framework necessary to act as the National Statistical Office (NSO) of Lebanon and perform activities related to collecting, compiling and disseminating statistics, including in the area of energy:

Decree No. 1793 (Feb 22, 1979) creates CAS and gives it the authority and responsibilities, among others, to collect, compile and disseminate statistics; to ensure the confidentiality of information collected; to respect the privacy of respondents; and to work with involved administrations to collect different kinds of statistics (e.g., MEW for energy).

Decree No. 2728 (Feb 28, 1980), in its Article 7, assigns the responsibility of compiling energy statistics to the CAS Production Statistics Department, “in cooperation with competent administrations” (e.g., MEW).

Ministry of Energy and Water (MEW)

MEW has legal backing to collect a vast amount of administrative data on electricity and petroleum products (including natural gas) through semiautonomous subsidiary bodies that would act as regulators of electricity, petroleum products.

Law No. 462 of September 2002 mandates the future creation of the National Electricity Regulatory Authority, which as of July 2019 has not been established yet⁵.

The Offshore Resources Petroleum Law (ORPL or Law No 132 of 24 August 2010) provided the legal and institutional framework for regulating oil and gas activities in Lebanon, mandating the creation of the Lebanese Petroleum Administration (LPA). The LPA was later established by Decree No. 7968 of April 2012 and appointed by Decree No. 9438 of 4 December 2012. The LPA is a regulatory body, operating under the authority of the Minister of Energy and Water (MEW), in charge of managing the upstream offshore petroleum sector in Lebanon.

Decree No. 10289 of 2013 sets out the Petroleum Activities Regulations (“PAR”), which provide the basic guidelines to conduct petroleum activities in Lebanon. Its Article 152 mandates that Right Holders collect/acquire data, records, logs and other information pertaining to Petroleum Activities and submit them to the LPA. The Decree No. 1177 of August 3, 2017, amended the Decree No. 10289 of April 30, 2013 (Petroleum Activities Regulations).

Institutional arrangements

Cooperation between ministries

The Ministry of Environment compiles data with a very similar scope to what is needed to construct energy balances, as these are required for calculating energy emission inventories to be submitted to the United Nations Framework Convention on Climate Change (UNFCCC) secretariat. The Ministry highlighted good cooperation with MEW and EDL⁶ to receive the requested data timely. It was highlighted that the Ministry of Energy and

⁵ Even if established, Lebanon has a substantial amount of unregulated electricity production by private generators, whose production would have to be surveyed or estimated for the purposes of compiling a full energy balance.

⁶ EDL is an autonomous public institution operating under the tutelage of the MEW.



Water, Ministry of Environment and Ministry of Agriculture are working on signing a Memorandum of Understanding to ensure even better cooperation, including in data sharing. More formal arrangements involving ministries are dealt with in the Council of Ministers, whose president is the Prime Minister.

Cooperation between ministries and CAS

The Ministry of Energy and Water shares monthly imports on petroleum products with the Central Administration of Statistics (CAS). Electricité du Liban shares monthly imports, production and sales on electricity by plant with the CAS. According to the legislation, organs of the MEW, including EDL, are obligated to send the data in paper format, which is an additional burden for CAS. No formal or informal institutional agreement currently completes the framework in order to allow additional data sharing in electronic format. The Central Administration of Statistics currently disseminates the statistics obtained from MEW and EDL in electronic format via their website.

The Central Administration of Statistics prepared some sort of energy balances for the period 2004—2017 with support from MEDSTAT⁷. However, according to the experts from CAS, these balances are provisional and not complete, and as such they are not published, shared or disseminated.

Human and financial resources

The Ministry of Energy and Water's General Directorate of Petroleum is lacking the human resources and the experience as regards the preparation of the statistical tables according to the developed scientific procedures and international methodologies. MEW recognizes the need to have a statistics unit.

EDL has adequate human resources for data handling, since this is administrative data needed to conduct business. Electricity delivered through a grid is generally easier to measure, and information on consumption is needed for proper billing.

The Central Administration of Statistics (CAS) faces problems in terms of human and financial resources, with currently one staff partly dedicated to energy statistics. CAS recognizes the need to conduct a national survey on energy consumption by sector in order to complete energy statistics and balances, however this survey stays out of its scope of work due to lack of funds and technical expertise.

The Ministry of Environment has adequate human and financial resources, thanks to many partnerships, including with the United Nations Development Programme (UNDP).

Energy profile of Lebanon

Production

Fossil fuels

Currently, Lebanon does not produce any primary energy of fossil origin, therefore importing all its fossil fuel needs, including for power generation. Significant reserves of oil and gas have been found offshore. After the first International Competitive Offshore Licensing Round, an agreement was signed between the Lebanese government and a consortium of three companies – Total, Eni and Novatek, regarding two maritime blocks

⁷ <https://ec.europa.eu/eurostat/web/european-neighbourhood-policy/enp-south/medstat-iv>



offshore Lebanon. The Lebanese government is also preparing to launch a licensing round pertaining to other blocks.

Biofuels

There is noted use of solid biomass for heating (fuelwood and charcoal⁸, as well as by-products of agricultural and forestry activities⁹), but currently the administrations are not able to account for these quantities due to lack of data.

Production of biodiesel from Waste Cooking Oil was tested and found not economical, so it will not be deployed in Lebanon for the moment being.

Electricity and heat generation

Most of the electricity generated by the power sector is produced using fuel oil and gas diesel oils. Some plants can switch to natural gas, and previously had operated for a short period on this gaseous fuel. Hydroelectricity represents a small but significant share of electricity generation in Lebanon, while solar PV and electricity from landfill gas are emerging as options. The government is in the process of deploying concentrated solar power in Lebanon.

Thermal electricity

Thermal electricity is produced mostly by main activity power plants (mostly EDL and private companies) in Lebanon. Two powerships are deployed in Lebanon (MV Karadeniz Powership Fatmagül Sultan, MV Karadeniz Powership Orhan Bey), each of 202 MW generation capacity. Some unregulated activity exists to supply unmet electricity demand, but little information is available about the corresponding generation.

Hydro electricity

Total hydroelectricity produced in Lebanon in 2016 was around 382 GWh, of which 12.6 GWh were produced by EDL, and 56.8 GWh¹⁰ produced by Kadisha.

Solar photovoltaics

There were solar photovoltaics (PV) installed capacities amounting to approximately 23 MWp in Lebanon in 2016, with 6.29 MWp of which owned by Industrial Sector¹¹. Those deployed by EDL generated around 35 GWh in 2016.

Biogases (landfill gas)

Naameh landfill 7MW Power Plant is connected to a local grid and started operations in October 2018.

Imports and exports

⁸ The National Renewable Energy Action Plan (NREAP) for the Republic of Lebanon 2016-2020.

⁹ Ouaini et al., "Chemical composition of olive cakes resulting from various mills in Lebanon", *Agrochimica - Pisa* - November 2010; and UNDP-CEDRO, <http://www.cedro-undp.org/Projects/details/128>. See also "Renewable energy and industry: Promoting industry and job creation for Lebanon", available on <https://data2.unhcr.org/en/documents/download/64709>.

¹⁰ Source for the three figures on hydroelectricity production: CAS

¹¹ According to 2016 Solar PV status Report for Lebanon, UNDP. The data are based on one-time survey conducted by UNDP.



Lebanon imported around 350 000 TJ of energy products in 2016, mostly oil products (8 033kt¹² in 2016), and small quantities of coal, electricity and solid biofuels. Oil products imported include liquefied petroleum gas (LPG), gasoline, gas/diesel oils, fuel oil, jet kerosene, and asphalt. The origins of these imports were not disclosed. In addition, the cement factories in Lebanon import coal or petroleum coke.

During some years, Lebanon imported electricity from both Syria (533.803 GWh in 2017 and 11.391 GWh in 2018) or/and Egypt (until 2012).

Other transformations

Currently, there is no other energy transformation in Lebanon as recognized by energy statistics.

Energy consumption

- **LPG** is mostly used by households for cooking using the liquid gas cylinders and for space and water heating. Other users of LPG are industries, agriculture and commerce and public services.
- **Motor gasoline** is deemed to be used only for road transport.
- Small quantities of **aviation gasoline** are used for commercial activities (Lebanon has a few planes for touristic entertainment).
- **Jet Kerosene** is used for international aviation. There are no domestic commercial flights.
- The majority of **gas/diesel oils** imported is delivered to main activity power generators, while the rest is used for space and water heating, for electricity generation by households and for transportation in diesel vehicles (trucks and buses). Lebanon currently has one color of diesel without distinction on heating oil and gas diesel.
- While the majority of imported **fuel oil** is delivered to power generators, the rest is delivered to the local market and mainly used by industries.
- **Bitumen** is mostly used for road paving and construction sealing.
- Imported **coal** or **petroleum coke** is used by cement factories.
- Some quantities of local **fuelwood** are consumed by households (mostly).
- Imported **charcoal** is consumed by commerce and households.
- Additionally, **biomass briquettes, wood pellets and olive pits/cake** are used by households for energy purposes.
- **Electricity** is consumed by industries, households, commerce and public services etc.
- There are solar water heaters (SWH) deployed in Lebanon, providing **direct use of solar energy** - that amounted to approximately 12 719 toe¹³ in 2014.
- Military uses both diesel oil and motor gasoline.

¹² Data source: MEW.

¹³ The National Renewable Energy Action Plan (NREAP) for the Republic of Lebanon 2016-2020



- Significant amounts of electricity are delivered to refugee camps, which use the electricity in households, hospitals and schools.



3. Data needs and data availability

This Chapter describes in detail energy data needs, sources and gaps, having as a guide an energy balance structure that may seem elusive at a first (or posterior) reading. For this reason, the reader is advised to refer to *Annex 3: Data availability matrix*, which consists of tables (corresponding to the “blocks” of an energy balance¹⁴) summarizing what data sources are available and what are the data gaps for the compilation of a full energy balance. This way, topics that may seem unrelated are put in context, facilitating a little bit the reading experience.

Main data users and their needs

Many energy data stakeholders were identified in Lebanon:

- The Ministry of Energy and Water is committed to improving access to sustainable energy, concentrating on two areas: increasing energy efficiency and the share of renewables in electricity mix. The Ministry, together with the Lebanese Center for Energy Conservation (LCEC¹⁵), sets targets in both areas and introduced policies to meet the targets. The complete energy balances are needed to measure progress toward meeting the targets, as well as to evaluate the policies. The Ministry highlighted its own internal needs to have detailed stocks information, including those maintained by the private sector.
- The LCEC is responsible for implementing the new National Energy Efficiency Action Plan (NEEAP) and the National Renewable Energy Action Plan (NREAP) as well as monitoring and evaluating targets set in the plans. A representative of LCEC highlighted the critical role of renewable energy statistics in their work and the lack of information in this domain. LCEC published just recently their first Energy Indicators report of the Republic of Lebanon; however, because of lack of breakdown of sectoral energy consumption, many estimates were used in the report. She also highlighted that, for calculating indicators to track energy efficiency improvements, the energy balances are not enough, as they do not provide end-use information.
- UNSD and IEA are among the five custodian agencies of the Sustainable Development Goal 7 (SDG7), providing data for two SDG7 indicators: SDG indicator 7.2.1 on renewable energy and 7.3.1 on energy efficiency. The indicators are calculated from detailed energy statistics provided by countries. As complete official energy statistics are currently not provided by Lebanese administrations, the indicators are calculated based on some official data, complemented by estimates.

¹⁴ See chapter VIII of the *International Recommendations of Energy Statistics* available at: unstats.un.org/unsd/energy/ires/

¹⁵ The Lebanese Center for Energy Conservation (LCEC) is the national energy agency for Lebanon. LCEC is a governmental organization affiliated to the Lebanese Ministry of Energy and Water (MEW) with a financially and administratively independent statute. LCEC acts as the technical arm of the Lebanese Government, specifically the Ministry of Energy and Water in all issues related to energy efficiency, renewable energy, and green buildings. The main role of LCEC is to setup national action plans and strategies to develop the sustainable energy sector in Lebanon. LCEC's role also expands to the implementation of national projects and initiatives undertaken by the Lebanese Ministry of Energy and Water. (from LCEC website: <http://lcec.org.lb/en/LCEC/AboutUs>)



- The Ministry of Environment (MoE) needs complete energy balances, including supply, detailed consumption breakdown, and corresponding calorific values (calorific values are currently estimated by MEW), as it is responsible for calculating energy-related GHG inventories and submitting it to UNFCCC. MoE is a data user and data producer. As data users they stay in close cooperation with MEW (imports of petroleum products) and EDL (electricity generation, stock changes etc), estimating the missing data based on available information and indicators. Data unavailability leads them to take data from international organizations (e.g. biomass information from FAO or international bunkers from IEA), which have estimated numbers based on models that may not reflect the reality in Lebanon.

Energy data collection activities and corresponding data availability

Energy data collection activities

The Lebanese Petroleum Administration (LPA), as the regulator of oil and gas sectors in Lebanon, collects vast amounts of data for administrative purposes. Since LPA is a subsidiary body of the Ministry of Energy and Water, the latter can access data on imports, stocks, deliveries and more. Pump stations are all georeferenced, and deliveries to these stations are all recorded. The breakdown of final consumption by type of user or purpose is not directly measured, though some of it (e.g., fuel delivered to EDL) can be inferred.

Imported energy products need to be signed off by customs, an official from MEW and an official from EDL, resulting in that these data are available to the three administration entities.

EDL collects detailed data on electricity generation by source, and consumption by paying customer. Electricity delivered through a grid (like in the case of EDL) is generally easier to measure, because the companies involved in production, transmission and distribution (or the system operator) keep track of most measurements, including for billing. What might not be available is the exact type of each consumer, but it may be possible to link consumers to a business register, if one exists, or to build a register to classify customers by type, as needed for an energy balance.

CAS does not directly collect energy data and relies on energy statistics shared by MEW and EDL. However, it carries out household surveys, such as Households Budget Surveys, that ask questions about expenditures on energy products. This information can be tapped to provide a basis for sound estimation, if no other better source is available. Alternatively, carefully chosen questions¹⁶ can be added to the survey.

The agricultural census collects little to no data on biomass use for energy purposes.

UNDP and the World Bank have worked with Lebanese administrations (for example the Ministry of Environment) to conduct some household surveys, but the regularity of such surveys, necessary to sustainable energy balance compilation, cannot be assured.

Data availability

Supply side

¹⁶ Please mind agreed principles of survey design and the Fundamental Principles of Official Statistics (<https://unstats.un.org/unsd/dnss/gp/fundprinciples.aspx>).



The Ministry of Energy and Water and EDL are in a position to provide monthly imports of oil products. The data reflect almost the full picture of energy supply to Lebanon (oil products are estimated to represent around 98% of all energy import to Lebanon). Private oil importers provide data to MEW on imports and sales by category (industrial, transport, etc.). There may be a need to validate customs data due to different practices in different ports (paying import taxes up front versus paying only what is going to the local market). Electricity imports are available from EDL on a monthly basis. The quantities of imported oil products and electricity are disseminated by Central Administration of Statistics in electronic format.

Stocks levels, stock changes and deliveries of oil products to international marine bunkers should be available from Tripoli and Zahrani Oil Installations. Stocks and stock changes of diesel oil and fuel oil for power plants should be available from EDL. Data on stock levels can be sensitive, but it should be noted that only stock changes are necessary to compile energy balances.

Data on the electricity generated by gaseous biofuels (biogas) are available, from which the biogas energy can be derived by applying an efficiency coefficient.

Data on primary electricity from hydro, wind and solar PV are available from EDL, though some private solar generation without feed-in schemes¹⁷ may not be captured and may need to be estimated based on installed capacity, which itself needs to be estimated or surveyed. Net metering is available with EDL, but it does not help with measuring the electricity generated by the solar panels.

Transformation

Since monthly output of each EDL power station is available and disseminated by Central Administration of Statistics in electronic format, information on electricity production from thermal plants can be coupled with imports oil products by EDL. However, these values do not represent actual input to the plants, as a portion of the purchase can be used for building stocks, or the opposite – some amounts of petroleum products from stocks can be used to feed the plants. Additional information on stocks changes of fuel within thermal power plants and its electricity own use would be needed to obtain a full picture of the power sector in Lebanon. EDL indicated that it can provide such data to MEW.

Distribution losses can be approximated by comparing electricity provided to the grid by plants and powerships (net production) and from abroad with consumption through the grid. Again, the quantities used by plants are not taken into account here, and this electricity own use should be provided separately.

Final consumption

No precise information on final consumption is available in Lebanon, and all the information as estimated based on supply and general information on consumption in the country. There is some indication of consumer type tied to the deliveries of fuel and electricity, but this consumer identification, which is crucial to the compilation of energy balances, needs to be properly explored.

Data gaps

The data gaps described here refer to the information needed to compile a complete energy balance. More information may be needed for compiling certain energy efficiency indicators, for example consumption by end

¹⁷ Feed-in schemes are currently not implemented in Lebanon.



use (cooling/heating, cooking, lighting, etc.), which is outside the scope of this document and therefore will be omitted.

Primary production

There is currently no primary production of oil and gas in Lebanon, but the regulatory framework ensures that quantities produced will be duly reported to MEW. The issue may be to ensure that the reporting is compatible with the *International Recommendations for Energy Statistics*¹⁸.

Private solar generation may not be properly captured and may need to be estimated based on installed capacity, which itself needs to be estimated or surveyed. EDL offers the possibility of net metering, which does not help with measuring the electricity generated by the solar panels.

Data on solid biofuels (e.g., fuelwood, olive cake, agricultural residues) burned for energy purposes are currently not collected.

Imports

Imports of oil products and electricity are well covered by the MEW and by CAS. On the other hand, private generator sets are imported to provide electricity demand unmet by EDL. Currently only the weight of these generators is collected by customs. Since their electricity production is not measured (or at least data are not collected), it needs to be estimated. As a basis for estimation, it would be good to collect information on generation capacity of imported generators.

Data on informal trade with neighbouring countries is unavailable and it should be estimated if possible. It should be determined if military imports are included in total imports reported by custom as required by the *International Recommendations for Energy Statistics*.

Some imports of charcoal and coal (or petroleum coke) are also available. It would be necessary to clarify whether it is petroleum coke (an oil product) or coal (and of which type) that is imported by cement companies, or if both are imported.

International bunkers

There is basically no domestic commercial flight in Lebanon, so all jet fuel use in flight can be assigned to international aviation bunkers. The issue may be to identify other uses for kerosene jet fuel (dual-purpose kerosene).

As to marine bunkers, most of fuel use by ships is for international travel, but the exact quantities are not currently measured. It should not be difficult to survey/estimate the use of fuel for fishing and for domestic navigation (both of which making a small part of the total) and deduct these quantities from the total to obtain use in international marine bunkers.

Stocks

¹⁸ <https://unstats.un.org/unsd/energy/ires>



Stocks levels and stock changes information is available from oil installations and EDL, but not from private generators and pump stations. It should be more straightforward to obtain data from pump stations, given the georeferencing and regulations on oil products by LPA, than from unregulated private generators.

Transformation

Quantities of fuel burned to generate electricity by EDL are available, as well as the corresponding electricity output. The challenge is to assess how much fuel is used by private generators. Collecting this information in surveys is desirable¹⁹.

Energy Industries Own Use

Electricity used by power stations (own use) are available from EDL, but again the issue is with the private generators. The use of other fuels to support the electricity generation (for priming the generators, for example) could also be collected.

The energy used in the mixing of imported propane and butane into Liquefied Petroleum Gas (LPG) should be accounted for as own use, but it is currently not assessed. Likewise, if Lebanon starts importing liquefied natural gas (LNG), it will be advisable to collect own use in regasification plants.

Electricity losses

EDL has high electricity losses, and it would help to distinguish between technical losses occurred in transmission and distribution, and non-technical losses, which can be included in final consumption.

Final consumption

The sectoral breakdown of final energy consumption is not thoroughly compiled in Lebanon. This is where most improvements can be made towards the compilation of a full energy balance.

For electricity, EDL has information on consumers by voltage, but not necessarily by class of consumer. Double use (e.g., when one dwelling is used as a household and a commerce point with only one meter) by single units make the classification of final electricity consumption difficult. EDL consumer base could be tied to a business register, like the one maintained by the Ministry of Finance for VAT purposes. For the households, the current deployment of smart meters offers an opportunity to survey clients and classify them as residential, commercial, agricultural, industrial (by ISIC economic activity), etc.

For other energy products, the inexistence of dedicated surveys means that there is no detailed information on final consumers. Such information could be fulfilled with data from household expenditure surveys or new business surveys.

No data are regularly collected from distributors by MEW, which might have key information on the nature of the final consumers. This information can be used in the short term directly to classify consumers to respective amounts delivered, and in the long term as a cross check to information collected through surveys. The MoE and

¹⁹ Protection of confidentiality of individual respondents should be prominently displayed to ensure minimal bias due to concerns on the use of the data.



UNDP have conducted surveys on distributors, who provide data on the final consumers. One issue is to know the final use of diesel, whether for private electricity generation or other uses.

Since energy use for transport is independent from the type of consumer in energy balances, data could be collected directly from distributors. However, information could be complemented by surveys for businesses that may use it in machinery, trucks and for autoproduction of electricity, and for households that may purchase road fuels and use them for other purposes.

For agriculture, information on energy consumption by fuel is not compiled but could be collected in the agricultural survey.

For the fishing industry, fishing vessels can be surveyed and pertinent information obtained.

Biofuels

Data on energy use of biofuels, including solid biofuels, are not collected. The household surveys conducted by CAS do not list fuelwood as a cooking fuel. It would be desirable to include it in the next survey, even if the expenditure surveys will not cover self-harvested fuelwood.

Calorific values/carbon content

Calorific values are essential for the compilation of energy balances, and also necessary to the calculation of Greenhouse Gas (GHG) emissions, mainly CO₂. The MEW can require importers to provide this information, but not to create standards which would be subject to testing.

Energy information systems

CAS and MEW do not currently have energy information systems; all energy data are stored in excel files. CAS is working with ISTAT (the Italian national statistical office) towards setting up one such system. In order to produce regular and comparable energy balances, it is crucial for the MEW to build an energy information system.

The MoE, on the other hand, has an energy information system (MISCA) for exchange of data (including from CAS), which will be used for emission calculations. A memorandum of understanding needs to be signed for MISCA to be operationalized. Apparently, the system does not allow for bulk data entry, which is a desirable feature that facilitates the good and sustainable functioning of regular data exchange.



4. Energy statistics action plan

The Energy statistics action plan proposed in this Chapter reflects Lebanon's demand for timely and reliable energy statistics and energy balances for evidence-based policy making and international reporting. This includes the calculation and reporting of Sustainable Development Goal 7 indicators.

The main conclusion of the technical assistance workshop is that Lebanon has already high-quality technical capacity in its administrations²⁰, access to valuable data sources, and adequate legal framework, but on the other hand needs to improve its institutional arrangements in order to centralize and coordinate energy data collection and compilation. The collection and compilation of energy statistics needed to create a full energy balance require involving many energy data stakeholders: fossil fuel producers, importers and distributors, electricity producers (including traditional power plants, hydropower plants, landfill gas power plants and solar PV generation) and statistical institutions conducting surveys on biomass used for energy purposes. The Ministry of Energy and Water (MEW) takes the ownership of energy data collection, compilation and production of energy balances, however is currently not backed up with strong institutional arrangements, a robust information system or adequate funding.

While building the first national energy balance should be considered as a milestone, it is important to highlight an urgent need to implement additional surveys both on energy consumption and on private electricity generation. The most challenging aspect here is the lack of funds and human resources within Lebanese administrations for conducting surveys.

In this Chapter, step by step recommendations are proposed for Lebanon to improve its institutional framework related to energy statistics, to build national balances and to improve the quality and coverage of the balances over time. The most immediate results envisaged in the energy statistics action plan for Lebanon is a first national energy balance published on the MEW official website.

Strengthening legal and institutional framework

During the technical assessment visit, it was confirmed that the institutional organization for energy statistics in Lebanon can be greatly improved. Currently, many energy stakeholders gather energy data from many sources (including figures estimated by international organizations without specific knowledge about the country situation) and estimate the missing data based on information obtained from a variety of sources, including ad-hoc surveys. Energy data collection is neither centralized nor coordinated, which leads to doubling of work and to inconsistent results between administrations. The Ministry of Energy and Water commits itself to improve energy statistics and to compile national energy balances, but the current lack of clear work distribution and lack of funding are the main barriers to the progress in this front.

The first step to improving institutional arrangements is gathering the relevant stakeholders involved in the collection, compilation, standardization and dissemination of energy statistics. This step was taken during the technical assistance workshop, where participants from the Ministry of Energy and Water, Office of the President of the Council of Ministers (PCM), Lebanese Petroleum Administration, Lebanese Center for Energy Conservation (LCEC), Electricité Du Liban (EDL), Ministry of Environment, Central Administration of Statistics (CAS) and UN (UNSD, UNDP and UN ESCWA) gathered together to assess data needs, make an energy data inventory and come up with the recommendations on improving energy data in Lebanon. The group worked efficiently, and the stakeholders showed a great commitment to coordinating energy data collection and improving transparency and quality of energy data.

²⁰ Although some institutions, like MEW and CAS, may need additional resources in quantity.



The high profit of establishing permanent relations between the core stakeholders involved in the collection, compilation and dissemination of energy statistics in a form of a working group (formal or informal) was discussed during the workshop. Participants highlighted the need to institutionalize the group, in order to having the importance of energy statistics recognized. It is recommended that the Ministry of Energy and Water as a main energy stakeholder in Lebanon will chair the group. The establishment of the energy statistics working group will have a major role in implementing other recommendations. It should be noted that extending the core group and inviting other relevant stakeholders (Customs, Ministries of Agriculture, Economy and Industry) may bring benefits in terms of better data scope and coverage, and reduced costs in the data collection efforts. Such working group could act as a coordination mechanism within the energy statistics system in Lebanon, discussing rights and responsibilities (which will be decided on a higher level) and avoiding duplication of work among main energy data stakeholders – reducing unnecessary burden, lowering costs and efficiently using the available resources.

A Memorandum of Understanding (MoU) is proposed for signature between different ministries of Lebanon and the MoU will include a data sharing agreement. For the time being, the MoU does not involve CAS, which can be an important data producer particularly in the area of sectoral energy consumption, in addition to possessing capacities and know-how on conducting surveys and sampling. Involving CAS in the collection of energy statistics should be considered a priority.

It was highlighted that the existing legal framework is not powerful enough for efficient data exchange, however updating of the framework needs to be considered as a long-term solution. Therefore, complementing the existing framework with solid institutional arrangements is the way to address this deficiency in the short term.

It is important to define a single institution responsible for disseminating official energy statistics and a single one for disseminating official energy balances (though they can be the same). If many institutions share energy data, it is important to ensure that only one set of official national energy statistics and balances exist. Since the MEW is taking ownership of this process of improving energy statistics and balances, it seems like the natural candidate to be the institution responsible for disseminating both energy statistics and energy balances.

Centralizing the work on energy statistics and balances and implementing the international recommendations require additional technical, financial and human resources. Having reliable and timely energy statistics is only possible when the long-term budget for energy statistics is ensured.

Compilation and dissemination of energy statistics and balances

With all the stakeholders gathered, the next step it is to analyse the flows of energy products relevant to the country, and identify possible data sources, including estimates based on surveys or available information. In this process, the gaps will be identified as a result. To fill the gaps, the following step is to identify the respective statistical units from whom to collect information. The same should be done for data items not covered completely by the current data collection system. These activities were initiated during the technical assistance workshop and the results are documented in this report (see *ANNEX 3: Data availability matrix*, presenting the data availability assessment matrix done by the participants during the workshop). Significant data gaps were identified for stocks, private generation of electricity and sectoral consumption. It is recommended to fine-tune the documentation on data availability by verifying possible data sources (e.g. during the energy statistics working group gathering, possibly extended to other relevant stakeholders identified during the workshop).

Following the definition of clear institutional arrangements for distributing rights and responsibilities (including data sharing agreements), the MEW should collect and compile all the energy statistics for a relatively recent year (e.g. 2017, following UNSD timeline). Additionally, the MEW should collect from suppliers (including local producers in the future) or importers the national calorific values for relevant products and flows as they are needed to compile energy balances. Once all the energy statistics are collected, their quality verified, and



metadata compiled and stored, the MEW should compile their first provisional national energy balance. Currently, these activities would require performing estimation or extrapolation of data from ad-hoc surveys (UNDP survey on solar PV, EPIC survey on use of gas oil/diesel oil done for Ministry of Environment etc.)²¹.

In order for the energy balances to fulfil their full potential to provide evidence for policymakers (e.g., to analyze trends or forecast energy flows), it is necessary to produce historical energy balances, and that should be the next step after the preparation of the first provisional energy balance.

As a medium-term solution, it is recommended that MEW will concentrate on activities which can significantly improve the data quality of energy statistics with relatively low costs, like:

- adding questions to existing surveys – e.g. cooperation with CAS on introducing questions to the household budget survey on energy consumed;
- adapting questions or changing forms – e.g. customs to get information on private generators capacities;
- increasing coverage of renewable electricity by LCEC.

At the same time, the MEW can work with EDL to improve the sectoral break down of electricity consumption. Currently, EDL is in a position to provide the breakdown of the delivery of low voltage electricity into four categories: (1) Industrial and Agriculture, (2) Households and commercial, (3) Public lighting, (4) Public services. Unfortunately, the breakdown is not detailed enough for the purpose of energy statistics. For the time being, the MEW can work with EDL to estimate historical shares for the main sectors (splitting industry from agriculture and households from commercial use), and this information can be used as a short-term solution to calculate the provisional energy balance. It is recommended that in the medium to long term EDL collects data with the sectoral breakdown of low-voltage consumers, by classifying consumers into the categories required by an energy balance. An opportunity to survey the clients about the nature of their use of electricity (important to define the sectoral breakdown) is currently presenting itself through the rolling out of smart meters. EDL could as well explore a possibility of introducing a census for major consumers of medium and high voltage electricity to identify the sectoral breakdown.

In the long-term, energy consumption surveys need to be conducted if improving the data quality on energy consumption is a priority. Conducting a survey on energy consumption in households is needed to identify the use of biomass for cooking (e.g. fuelwood, charcoal), which is often underestimated by countries. This information is crucial for policy makers as it helps to predict the future demand for energy when the fuelwood and charcoal are replaced by clean cooking fuels and technologies. The household survey should be repeated regularly in order to reasonably interpolate the information between the years, and the frequency of the survey should be planned ahead (e.g. each 5 years). The MEW, in collaboration with CAS, could introduce an annual industrial energy survey, as it is difficult to estimate energy consumption in this sector, particularly by type of industry.

It was not possible to identify any data sources on the use of energy in agriculture, as the Ministry of Agriculture was not present during the meeting. If no data are available, it might be possible to estimate the energy consumption in this sector using indirect data (e.g. machinery and unit consumption data), assuming that such indirect data are available or collected from the Ministry of Agriculture/CAS. Biomass use for energy purposes in agriculture will still be missing, though.

²¹ A stepwise approach can be adopted, where the first balance will have some estimated data to fill gaps and use default calorific values, and then gradually data collection will allow lesser use of estimated data and specific calorific values to be employed.



The split of fuel quantities consumed for domestic transportation and international bunkers is currently not assessed. For aviation, there are no domestic commercial flights in Lebanon, so all consumption of jet kerosene by planes can be considered as international aviation bunkers. Data on imports are available but those do not equate to consumption, as there can be stock build/draw, and households can use jet kerosene for cooking. It would be desirable to obtain data on refuelling of planes directly, but if not possible, data on delivery to airports and stock changes at the airports can be collected to arrive at an indirect measure. Surveying uses of jet kerosene other than aviation (e.g., cooking) is also advisable.

For navigation, most of the fuel is supplied to ships undergoing international travel (considered as international marine bunkers). As in the case of aviation, data on deliveries of fuel to ships would ideally be obtained directly. Other uses of fuel oil for vessels include fishing vessels (final consumption for fishing), domestic navigation (transport) and leisure.

The Ministry of Environment estimated these quantities for their own needs with information from a specialized survey and the use of other available information. This split between domestic transport and international bunkers is needed for the estimation of CO₂ emissions according to the IPCC methodology. These data could be used for a provisional balance compiled by the MEW, but other data sources should be explored (Ministry of Interior, ports, association of yacht clubs, airports, etc.) in order to compile an accurate energy balance.

Lebanese administrations can use the Energy Balance Studio (EBS) programme developed by the International Atomic Energy Agency (IAEA) to compile their energy balances. It requires filling and uploading the UNSD Annual Questionnaire on Energy Statistics and UNSD questionnaire on caloric values to the software. EBS calculates the energy balances automatically and allows users save the energy balances directly from the software to excel files²².

It is recommended that the energy balances are disseminated through the MEW website and sent directly to key stakeholders. Here, the cooperation with the international community is essential, and submitting the energy statistics to relevant international and/or regional organizations (UNSD, IRENA, IEA) will allow an extra layer of quality checks to be performed. Additionally, the international community can support the Lebanese administrations via trainings and expert advice on an ad hoc basis²³. It is important to highlight that the two SDG7 indicators (7.2.1 on renewable energy and 7.3.1 on energy efficiency) used by the UN for tracking progress toward the goals are calculated directly from energy statistics provided by national administrations to UNSD or IEA.

As the MEW is willing to take the lead on energy statistical services, it is recommended that energy statisticians are trained in the international standards and methodologies. The Ministry should explore possibilities of its staff attending online courses, JODI workshops and/or IEA courses on energy statistics. In the medium term, it is advisable that Lebanese statisticians attend a national or regional workshop in the area. Frequent staff training is recommended both during the establishment of a new information system and after, to ensure that the energy statisticians are up-to date with the international methodology and that they are familiar with reporting of new developments in Lebanon.

For the energy statistics working group to function properly, it is advisable meeting on a relatively regular basis to discuss new developments that may affect the energy landscape (like concentrated solar power, gas production, etc.). The new developments may require to be recorded in energy statistics, in which case all the

²² There exist other free softwares which facilitate production of energy balances from energy statistics, like IEA Energy balance builder.

²³ Lebanon as a beneficiary of MEDSTAT IV projected funded by European Union can join the activities in the area of energy statistics and balances. Under MEDSTAT IV, technical and financial support is provided for a wide set of events such as working group meetings, workshops, training sessions, study visits and technical assistance missions carried out by experts.



process of identifying data sources and ensuring a legal and institutional framework to back up the data collection should be followed. Energy statisticians should utilize a robust and user-friendly information system, to be introduced in the MEW for data collection, compilation and dissemination in order to ensure the sustainability of producing the energy balances and the high quality of data.

All the activities mentioned above – introduction of an information system within the Ministry, establishing a unit dedicated to energy statistics, training energy statisticians and conducting surveys – require additional funding. It is recommended to secure long term funding for all regular activities, while seeking additional financing for one-time expenses (e.g. involving donors from WB, GIZ, EU, UNDP for support in establishing the information system within the Ministry, providing training/assistance on preparing the survey, etc.).

Data needs beyond energy balances

Provided that adequate and additional financial and human resources are secured, the MEW should consider expanding its energy statistics activities and initiating the compilation of monthly statistics and the preparation and submission of JODI questionnaires²⁴, as well as establishing a powerful system of collecting relevant internal stocks information.

The MEW is committed to improving the energy efficiency in Lebanon, which is reflected in the publication of a National Energy Efficiency Action Plans (NEEAP). In order to empower evidence-based policy making in the area, the MEW should consider the collection of data needed for the calculation of energy efficiency indicators. For this purpose, it is recommended the introduction of a sustainable survey on energy end-use (cooling, cooking, lighting, etc.) to cover data needed for the compilation of such indicators, which will enable the establishment, monitoring and evaluation of energy efficiency related policies.

Currently, the Ministry of Environment calculates CO₂ emissions according to the IPCC methodology based on a variety of data sources. However, the official national energy statistics and balances should be the basis for calculating the CO₂ emissions. Therefore, the MoE is a key user of energy data and as such cooperation between the MEW and the MoE should be considered as essential. The Ministry of Environment would appreciate if, in addition to obtaining energy statistics and balances, the specific carbon emission factors for Lebanon are determined.

Table: Detailed recommended actions for Lebanon

Action plan	Priority	Timeframe
<i>Institutional Framework</i>		
Main finding: Ministry of Energy and Water takes ownership of energy data collection, compilation and production of energy balances; however it is not currently backed up with a strong institutional organization and adequate funding.		
To improve further the institutional framework of collecting official energy data, the following action points are identified:		
Action 1: Gather the relevant stakeholders involved in the collection, compilation, standardisation, dissemination and use of energy statistics.	Very High	Started (ongoing)

²⁴ Countries participate in JODI initiative via international organizations, in case of Lebanon via UNSD.



Action 2: Establish an appropriate inter-agency coordinating mechanism headed by the MEW, involving all other relevant stakeholders: CAS, MoE, PCM and others (Customs, M. of Agriculture, Economy and Industry).	Very High	Short term
Action 3: Clearly define the rights and responsibilities (including data sharing) of each of the stakeholders involved in data collection and compilation, including by nominating an institution/office responsible for centralizing energy data processing and ensuring data quality. (Refer to <i>Annex 3: Data availability matrix</i> done by the participants).	Very High	Short to medium term
Action 4: Use the existing legal framework to support the rights and responsibilities defined in Action 3 and plan for an update of the framework if needed. Complement the framework with institutional arrangements to make it more efficient.	High	Short to medium term
Action 5: Coordination Committee on Energy Statistics, chaired by the Directorate General of Oil (see Action 2) to decide on a dissemination procedure for the official energy statistics and balances of Lebanon.	High	Short term
Action 6: Estimate the needs for technical, financial and human resources. Ensure long-term budget for energy statistics and liaise with donors to fund additional resources for one-time expenses.	High	Medium to long term
<p><i>Balances compilation and dissemination</i></p> <p>Main finding: the Ministry of Energy and Water collects data on oil imports and public electricity generation which are the main source of energy supply in Lebanon. Despite that, some significant data gaps were identified, particularly information on final consumption and biomass use, which are needed to describe more precisely the energy situation in Lebanon and provide data for Tracking Sustainable Development Goal 7.</p> <p>To further improve the official energy data, the following action points are identified:</p>		
Action 1: Detailed analysis of flows of energy products relevant to Lebanon, and identification of the respective populations of statistical units, to ensure complete coverage and to assist in sample design. (Current draft on data availability from meeting to be fine-tuned).	High	First draft completed
Action 2: Identify existing data sources, possible data sources (including estimates based on existing surveys and available information) and data gaps. The same for data items not covered completely (ex: stocks, private generation of electricity, end-use). (Current draft on data availability from meeting to be fine-tuned).	High	First draft completed
Action 3: Develop reporting mechanisms for energy statistics and calorific values based on international standards (IRES) (technical specifications).	Very High	Medium term



Action 4. Produce the first national energy balance of Lebanon following international recommendations, paying attention to quality control and metadata. Produce historical energy balances.	Very High	Short term
Action 5: Ensure sustainability and timeliness of producing the energy balances.	Very High	Medium to long term
Action 6: Prioritize the major data gaps that can be addressed easily. Check possibilities of: <ul style="list-style-type: none"> adding questions to existing surveys (household surveys, business surveys) adapting questions or changing forms (customs to get information on private generators capacities) increasing coverage of renewable electricity by LCEC. 	Medium	Medium term
Action 7: Introduce sustainable survey(s) on energy consumption to cover missing information/ information based on rough estimates. Identify possible sources of funding (including donors from WB, GIZ, EU, UNDP, etc.).	High	Medium term
Action 8: EDL to survey low-voltage clients and to introduce census for major clients of medium and high voltage, in order to identify the sectoral breakdown (residential, commercial, industrial etc.). (Long term solution, proposal to see if feasible.)	High	Medium to long term
Action 9: Form/train energy statisticians. Support them with an integrated information system for reporting, processing, compiling and disseminating energy statistics.	Very high	Medium to long term
Action 10: Discuss new developments that may affect the energy landscape (like concentrated solar power, gas production, etc). Anticipate relevant actions to take the new developments into account in the data collection (including laws).	High	Long term
Action 11: Report data to relevant international/regional organizations (UNSD, UN ESCWA, JODI, IRENA, IEA).	Medium	Medium to long term
Data needs beyond energy balances		
Main finding: In December 1994, Lebanon ratified the United Nations Framework Convention on Climate Change (UNFCCC). The Ministry of Energy and Water is committed to improving access to sustainable energy in Lebanon, concentrating on improving energy efficiency and increasing share of renewables. However, evidence-based policies require reliable data.		
To improve further the official energy data needs, the following action points are identified:		
Action 1: Introduce a sustainable survey on energy end-use to cover data needed for energy efficiency indicators. The calculation of such indicators will help to establish, monitor and evaluate energy efficiency related policies.	Medium	Long term



Action 2: MEW to establish a powerful system of collecting relevant internal stock information.	Medium	Medium term
Action 3: Determine typical carbon emission factors for Lebanon.	Low	Medium term
Action 4: Initiate the compilation of monthly statistics and the preparation/ submission of JODI questionnaires.	Low	Medium to long term



ANNEX 1: Agenda

AGENDA

UNSD/ESCWA Technical Assistance to Lebanon on Improving Energy Statistics for Sustainable Development – Assessment Mission

2-5 July 2019, UN House, UN ESCWA, Beirut, Lebanon

Day 1	
9:00 -11:30	<p>Session I.1: Getting to know users and uses (current and desired) of energy statistics in Lebanon</p> <ul style="list-style-type: none"> - Introduction (purpose of the meeting, who we are, why we are here – ESCWA and UNSD) - Overview of energy statistics and balances, with links to policy making (UNSD) - Lebanon Plan for Energy Information (MEW, CAS) - Energy data uses and needs (other national stakeholders) – for example, are there goals (including sustainable development goals)/ policies in place that require energy statistics? - UNDP, World Bank, EU – what kind of assistance and projects are available - Wrapping-up session by UNSD and ESCWA
12:00- 3:00	<p>Session I.2: Technical meeting for the assessment of the status of energy data</p> <p>Compiling an inventory of current data sources:</p> <ul style="list-style-type: none"> - Surveys (economic and household surveys) - Administrative Data (Electricity, Customs) - Reports of Companies (Importers and Distributors) <p>Identifying gaps and exploring additional possible sources:</p> <ul style="list-style-type: none"> - Imports - Transformation - End use consumption by sector: agriculture, households, commerce, government, industry, transport - Other statistical units: private generators, electricity providers, etc. - Biomass - Calorific Values <p>Wrap up:</p> <ul style="list-style-type: none"> - Expanding existing surveys to cover data gaps, if applicable
Day 2	
9:00 -11:30	<p>Session II.1: Identifying commonalities and exploring of synergies toward a more efficient data collection system</p> <ul style="list-style-type: none"> - Identification of possible duplication in data collection. Comparison of overlapping collection, as applicable - Streamlined data collection processes – combination of data sources; collect once and use many times. - Existing energy information system, if any
12:00- 3:00	<p>Session II.2: Exploring how responsibilities can be assigned (is there a need for changing the legal framework?), what news kinds of cooperation can be made (institutional arrangements).</p> <ul style="list-style-type: none"> - Possible institutional arrangements (formal or informal).



	<ul style="list-style-type: none"> - Can inter-departmental teams work together? - Wrap up (round table): Is the legal framework adequate for the additional data sources identified for energy data collection?
Day 3	
9:00 -11:30	<p>Session III.1: Technical meeting. International methodology in Energy Statistics (from the <i>International Recommendations for Energy Statistics</i> - IRES)</p> <ul style="list-style-type: none"> - Basic concepts in energy statistics: products and flows; scope of energy statistics; supply, energy industries, final consumption; units and calorific values; primary and secondary energy; renewable and non-renewable energy. - Standard International Energy Product Classification (SIEC); cross-classification of users and uses.
12:00-3:30	<p>Session III.2 (technical meeting) Principles of compilation of Energy Balances – exercise with the energy balance of Lebanon</p> <ul style="list-style-type: none"> - Components of supply, transformation, energy industries own use; final consumption (energy and non-energy) - Exercises - Importance of conversion factors/calorific values - Uses of energy statistics: Indicators, including SDG indicators, energy-related CO2 emission calculation
Day 4	
9:00 -11:30	Roundtable discussion - practical considerations for the national energy statistics action plan
1:30 - 3:00	Drafting of step-by-step action plan for improving energy statistics (Short-term, medium-term and long-term actions)



ANNEX 2: List of participants

Ministry of Energy & Water (MEW)

- Ms. Aurore Feghali, Director General of Petroleum Directorate
- Mr. Dany Samaha, Advisor to the minister
- Mr. Walid Nassr, President of the Lebanese Petroleum Association*
- Mr. Josseph El Assad, Advisor*
- Ms. Suzy Hoayek, Advisor*
- Mr. Mustafa Alaywan, Head of Department of Studies, Research and Statistics
- Mr. Ali Ezzedine, Accountant
- Ms. Safaa Ibrahim, Chief of Service of Technical Affairs DGO-MEW
- Ms. Khadija Nouredine, Chief of Service of Economic and Financial Affairs
- Ms. Joumana Khawand, Chief of Service of Cabinet
- Mr. Ali Ismail*

Office of the President of the Council of Ministers (PCM)

- Ms. Ola Sidani, Economic Officer
- Ms. Rawaa Harati, Advisor

Lebanese Petroleum Administration (LPA)

- Mr. Majd Olleik, Strategic Planning Department

Lebanese Center for Energy Conservation (LCEC)

- Dr. Sorina Mortada
- Eng. Rawad Nasr

Electricité Du Liban (EDL)

- Mr. Kamal Hayek, Director General*
- Ms. Layla Abi Fadel, Head of Statistics Analysis Department
- Mr. Ralph Stephan, Head of Programs and follow-up Department

Ministry of Environment (MoE)

- Ms. Nathalie Karam
- Ms. Lea Abou Jaoude
- Mr. Vahakn Kabakian

Central Administration of Statistics (CAS)

- Mr. Albert Khalil, Statistician
- Ms. Nadine Saliba, Statistician
- Ms. Riwa Hammoud, Statistician
- Ms. Liliane Nasr, Statistician

* Involved in the process but absent from the meetings.



UNDP

- Mr. Ahmad Diab, Engineering Support Consultant
- Ms. Carla Nassab, Energy Engineer
- Mr. Jad El Baba, Energy Engineer
- Mr. Noritaka Hara, Programme Analyst
- Ms. Lea Bou Fadel, Junior Economic Researcher

UN ESCWA

- Ms. Wafa Aboul Hosn
- Mr. Juraj Riecan
- Ms. Maya Mansour
- Mr. Wassim Hammoud
- Mr. Ramzi Fanous
- Mr. Omar Hakouz

United Nations Statistics Division (UNSD)

- Ms. Agnieszka Koscielniak, Statistician
- Mr. Leonardo Souza, Chief of Energy Statistics Section

International Energy Agency (IEA)

- Celine Rouquette, Energy Data Center (Remote participation)

Energy experts

- Dr. Walid AL DEGHAILI, Consultant in Energy
- Dr. Ali Ahmed, Program Director, Energy Policy and Security in the Middle East, Issam Fares Institute for Public Policy and International Affairs, American University of Beirut*



Transformation				
SIEC Code	Name	Electricity plants		Other transformations
		Public/Private	Auto-producers	
Oil				
4671	Gas/Diesel oil	Multiple sources: -EDL Data of suppressed hours/ -Minis. of Economic/ -Municipality -customers -Further research is requested -ELEC Zahle & Jbeil during suppressed period EDL	Possible: CAS Living condition survey Further research is requested	
468	Fuel oil			
Natural Gas				
3	Natural Gas			
Renewable and Waste				
	Landfill gas	Nehmeh, Saida		

	Data available on monthly basis
	Data available on annual basis
	Not covered by the current data collection system
	Not applicable for our country



Final consumption

SIEC Code	Name	Final Energy consumption						Non-energy use
		Industry	Transport	Households	Agriculture, forestry, fishing	Commerce and public services	Other	
Coal								
0122	Other bituminous coal Others coal?	Cement						
Oil								
463	LPG	APEC MoE Gas Suppliers		CAS APEC MoE Gas Suppliers NB: to include consumption by Camps: CAS & UNDP	APEC Gas Suppliers	MoE Gas Suppliers		
4652	Motor gasoline		Customs DGP APEC					
4651	Aviation gasoline							
4661	Kerosene Jet Fuel							
4671	Gas/Diesel oil	DATA estimated by specialized survey by Ministry of Environment Ministry of Interior (Data for transport)						
468	Fuel oil	Cement – LPA (SODEL project)						
4695	Bitumen (Asphalt) Other oil products							
Natural Gas								
3	Natural Gas							
Renewable and waste								
511	Fuelwood		CAS Customs					
516	Charcoal Briquettes and wood pellets and olive pits/cake				Suppliers for briquettes	Minister of Agriculture Customs		
Electricity and heat								
	Solar water heaters		LCEC					
	Electricity	EDL have partial breakdown of low-voltage on categories: 1. Industry and Agriculture 2. Households and Commercial 3. Public lightening 4. Public services. EDL have no breakdown of medium voltage and high voltage.						

	Data available on monthly basis
	Data available on annual basis
	Not covered by the current data collection system
	Not applicable for our country



ANNEX 4: Imports of petroleum products

Type		Imported Quantities/MT						
		2012	2013	2014	2015	2016	2017	2018
LPG	Mixed (Butane+Propane)	208,000	231,600	196,000	204,000	215,780	207,495	204,365
	Propane	27,000	28,800	24,062	34,715	22,950	27,669	24,363
Gasoline	98 Unleaded Octane	240,115	236,079	253,874	279,787	296,971	300,524	273,062
	95 Unleaded Octane	1,445,359	1,360,261	1,465,776	1,625,587	1,728,895	1,796,272	1,709,575
Gas Oil	Private Sector (Diesel)	1,087,056	1,375,385	1,450,881	1,660,588	1,644,332	1,743,276	1,545,850
	EDL	1,320,203	1,174,529	1,268,852	1,284,327	1,288,986	1,154,226	1,296,240
	Tripoli and Zahrani Oil Installations	861,553	525,661	532,028	725,904	767,516	840,137	584,054
Kerosene		207,337	258,891	229,101	205,441	243,946	269,633	263,762
Fuel Oil	Industry Sector	149,527	148,602	170,669	171,353	133,181	153,028	155,367
	EDL	988,359	1,183,431	1,413,055	1,415,165	1,555,534	1,916,201	1,870,818
	Tripoli and Zahrani Oil Installations	0	0	19,668	32,088	43,208	25,689	21,788
Bitumen		78,563	57,102	54,004	80,385	91,841	93,497	105,564
TOTAL		6,613,070	6,580,341	7,077,969	7,719,339	8,033,142	8,527,649	8,054,807

Source: Ministry of energy and water



Acronyms

CAS - Central Administration of Statistics

FAO - Food and Agriculture Organization of the United Nations

IEA - International Energy Agency

IRES - International Recommendations for Energy Statistics

LCEC - Lebanese Center for Energy Conservation

LPA - Lebanese Petroleum Administration

MEW - Ministry of Energy and Water

MoE - Ministry of Environment

NEEAP - National Energy Efficiency Action Plan

NREAP - National Renewable Energy Action Plan

PCM - Office of the President of the Council of Ministers

SDG - Sustainable Development Goals

UN ESCWA - United Nations Economic and Social Commission for Western Asia

UNDP - United Nations Development Programme

UNFCCC - United Nations Framework Convention on Climate Change

UNSD - United Nations Statistics Division