AMERICAN UNIVERSITY OF BEIRUT
NATURE CONSERVATION CENTER
ISSAM FARES INSTITUTE FOR PUBLIC POLICY AND INTERNATIONAL AFFAIRS

THE ENVIRONMENTAL AND POLICY IMPLICATIONS OF SOLAR ENERGY:
THE LIGHT AMIDST LEBANON'S CRISIS?

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AUB-NCC 2023 ROUNDTABLE SERIES - BRIEF #2

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This discussion is the second of AUB-NCC's 2023 series of roundtables, titled

"Navigating Climate Change and environmental activism in the MENA region: Challenges and Opportunities"

Roundtable discussion Organized on May 9th 2023 at the Basile Antoine Meguerdiche Conference Hall – Issam Fares Institute for Public Policy and International Affairs (IFI).

The series is co-designed with:

AMERICAN UNIVERSITY OF BEIRUT | NATURE CONSERVATION CENTER | ISSAM FARES INSTITUTE FOR PUBLIC POLICY AND INTERNATIONAL AFFAIRS | ASFARI INSTITUTE FOR CIVIL SOCIETY & CITIZENSHIP | HEINRICH BÖLL STIFTUNG BEIRUT Middle East | Arab Reform Initiative

Panel:

Dr. Vahakn Kabakian
Climate Change Advisor at the United Nations Development Programme and Lebanese Ministry of the Environment (UNDP/MoE)

Khalil Dinguizli
Associate Director, Head of Lebanon Resident Office at the European Bank for Reconstruction and Development (EBRD)

Dalia Jubaili
Member of the Board of Directors of Jubaili Group Holding & Vice Chair of AUB-NCC's Advisory Board

Souraya Machnouk
Partner at Abou Jaoude & Associates Law Firm

Pierre Khoury
President of the Lebanese Center for Energy Conservation (LCEC)

Carol Ayat
Energy Finance Professional, Investment Banker and IFI Associate Fellow (moderator).

BACKGROUND:

Lebanon's financial meltdown exacerbated the degradation of public services, especially the provision of stable energy. As public electricity became limited to a few hours per day, private generators, as informal service providers, extended their spread throughout the country, to fill the gap caused by Électricité du Liban (EDL)'s near collapse. At the same time, the State's ability to safeguard its constituency through accountability, regulation and welfare significantly shrunk. Consequently, the living conditions and health of citizens were at stake as pollution rates linked to the heavy use of generators alarmingly exceeded internat ional standards.

With the unfolding of the economic crisis and the removal of fuel subsidies, generator fees skyrocketed. Many households and businesses were prompted to invest in solar energy, as a means to secure a more affordable alternative to sustain their livelihoods and reduce their dependance on energy providers. The country witnessed one of the highest deployments of distributed solar energy per capita, reaching a national capacity of almost **One Gigawatt** by June 2023, covering a major part of the country's produced energy. This rapid scale up outpaces the ability of the government to propose the proper regulatory framework, and the private sector's technical capacity to deal with this high demand.

According to the US Department of Energy – Office of Nuclear Energy, 1 Gigawatt of power is equal to:

3.125 MILLION	333 UTILITY SCALE	100 MILLION
Photovoltaic Panels	Wind Turbines	LED Bulbs

Inspired by the findings of Re-energize Lebanon and the dynamics of the solar energy sector in the country, the American University of Beirut Nature Conservation Center and Issam Fares Institute for Public Policy and International Affairs (IFI) joined efforts in the 2023 roundtable discussions and brought together a panel of experts from various fields to unveil the environmental and policy implications of the solar energy boom in Lebanon and its potential future pathways.

SUMMARY OF THE DISCUSSION:

The panel discussion shed light on the growing solar energy sector in Lebanon, its current status, regulatory framework, and sectoral implications, with interventions from actors representing governmental entities, the private sector, UN agencies, international financing institutions, and law firms.

Mrs. Jubaili began by stating that the high and rapid demand on solar energy to complement diesel generators, was not accompanied by the needed infrastructure in Lebanon. She mentioned common challenges reported by consumers, often related to hazardous installation, wiring connection and low quality standards. Nonetheless, she acknowledged efforts by private companies to mitigate these threats. Some of these inititiatives include the free provision of quality control and customer advise. For reference, she spoke about the services offered by Jubaili Bros that ensure proper functioning, optimize efficiency, and fill operational gaps in the newly expanding sector. Moreover, she presented the company's efforts to educate consumers, increase awareness material and engage students in designing innovative solutions for urban residential panels.

From a technical point of view, Mr. Khoury advised consumers to refer to the list of certified solar energy companies prepared by the Lebanese Center for Energy Conservation (LCEC) before any installation. He also stressed on the need to differentiate between suppressed demand due to financial constraints, and decreased demand due to a change in behaviour to better understand market dynamics. Mr. Khoury went on to confirm that the Lebanese government had long been envisioning a shift to renewable energies, but was never able to achieve that despite the multiple strategies, standards, and laws that have been enacted. This shift was locked as the cost of fossil-based electricity remained relatively cheap until 2021 in the presence of subsidies, thus discouraging renewable energy deployment. Moreover, he confirmed that the shift to solar was accelerated by the removal of diesel subsidies, despite the absence of incentives, as people became fully aware and forced to find more affordable and reliable energy sources.

DEMAND ON EDL ENERGY DECREASED BY 50% IN 2022 - LCEC

Building on that, Ms. Machnouk discussed the solar regulatory framework, citing key legislations and entities directly or indirectly influencing this sector, with an emphasis on the Distributed Renewable Energy (DRE) law.

LEGISLATIVE TEXTS THAT IMPACT THE SOLAR ENERGY SECTOR IN LEBANON

1964
Law that established EDL, mentioning the ability to produce energy for personal use.

2002
Law 462 establishment of the ERA and calling for the unbundling of the sector.

2009
Lebanon sets a target in Copenhagen to reach 12% of renewable energy by 2020.

2014
Law 288 grants the council of ministers the exceptional authority to grant licenses instead of the ERA. This law was extended in 2015 to 2019, then cutoff in 2022.

2019
Decision 132 issued by the Higher Council for Urban Planning to dictate how the solar systems should be installed.

2022
Draft DRE and Energy Efficiency laws awaiting legislation at parliament: foundations for peer to peer contracts and net metering.

2023
Solar PPAs signed to establish 11 farms each with a capacity of 15 MW.

The latter, awaiting legislation to-date, is designed to serve as a foundation for peer-to-peer distributed energy contracts and net-metering billing mechanisms. Additionally, she explained the licensing processes and authorized entities to issue energy trade permits.

LAW 462 (2002)

GENERATION OF <1.5 MW:
NO AUTHORIZATION NEEDED FOR PERSONAL USE

GENERATION OF 1.5 TO 10 MW:
AUTHORIZATION NEEDED FROM ERA

GENERATION OF >10 MW:
LICENSE AND APPROVED FORM NEEDED FROM THE ERA

*IN ABSENCE OF ERA, THE COUNCIL OF MINISTERS IS GRANTED THE EXCEPTIONAL AUTHORITY TO PROVIDE LICENSES

In his turn, Mr. Dinguizli from the European Bank for Reconstruction and Development (EBRD) discussed the concept of credit worthiness, currently at its lowest in Lebanon mainly due to the banking crisis and volatile exchange rates. He emphasized the need for

reforms as an attempt to alleviate the multiple risks discouraging investments in the solar sector in Lebanon. Mr. Dinguizli also insisted that this "de-risking" can be achieved through credit enhancement tools done together with the Government, to significantly reduce costs and attract large scale projects into the country.

From an envivronmental perspective, Dr. Kabakian linked the discussion to the status of Lebanon's Nationally Determined Contributions (NDCs) and shed light on the sectoral implications, especially the increased pressure and negative impacts on the environment that might arise from solarization. Those include natural resource degradation, biodiversity loss, land use conversion, visual pollution and a foreseen e-waste crisis unless strategies reunite better. Building on previous studies Dr. Kabakian undertook, the panelist concluded with a set of recommendations related to risk management and urban planning for decision-makers.

All panelists underlined the importance of collaborative efforts to develop a holistic framework for renewable energies in Lebanon. They also highlighted the need for urgent reforms to attract funds into this growing sector. Most importantly, they stressed the importance of cross-sectoral multidisciplinary research, to better inform policies and strategies related to solar energy, based on scientific evidence.

PRIORITY AREAS OF INTERVENTION:

PUBLIC AWARENESS FOR PUBLIC SAFETY

Empowering consumers with knowledge is essential to increase efficiency and safety across the sector, as they are the primary stakeholders in the quality of the products they are purchasing. Educating households, municipalities and industrial actors on quality and safety standards is also key. It is also important to mainstream tools that can help citizens optimize their energy efficiency by calculating their exact power needs and ensuring the right load management. Awareness is equally important when it comes to mitigating the negative environmental impacts and life hazards that might arise from this technology. Moreover, the rapid demand for solar energy within weak structural settings signals the need to mobilize communities to call for reforms and lobby for a regulatory framework for this sector.

THE NEED FOR A NEW ENERGY VISION FOR LEBANON

Liberalizing the market for solar energy provision and distribution is a key pillar to ensure the efficient operation of this sector. By removing bureaucratic barriers and promoting transparent bidding, entrepreneurs and businesses are encouraged to invest in innovative projects, creating jobs and securing accessible and affordable energy solutions to all Lebanese. The positive competition would also promote investments in research and development, to secure technological advancements and enhance the performance of solar systems.

Decentralized energy distribution allows consumers to have more choices and control over their energy sources, allowing them to make environmentally conscious decisions. However, formalizing non-governmental service provision requires a strong regulatory framework and governance. A specified unit within EDL needs to be established to manage the unbundling of the country's generation, transmission and distribution of renewable energy. Therefore, to ensure the decentralized operation of this sector, there is a pressing need for the Lebanese government to revamp its energy vision and align with the latest policies, innovations and realities worldwide.

REDUCED EMISSIONS WITH COLLATERAL DAMAGE

An immediate material recovery strategy is needed, to avoid the anticipated accumulation of solar waste. The rapid scale up of solar energy, with constant deployment, replacement and disposal of equipment, requires high level interventions to mitigate any potential risk. Renewable energies commonly perceived as a "green" alternative, still hold remarkable implications on the environment and communities that should be taken into consideration. Besides waste, land use tradeoffs should be balanced to safeguard food security, prevent biodiversity loss, and preserve natural resources, especially when large areas get converted to accommodate solar panels.

Moreover, urban planning policies should facilitate the integration of innovative renewable energy sources into buildings without compromising landscape aesthetics. Nevertheless, achieving these targets remains a challenge as it requires joint efforts from multiple ministries, municipalities, research institutes and the private sector.

RESTORING TRUST TO UNLOCK INVESTMENTS AND DEVELOPMENT

The Power Purchase Agreement signed in May 2023 for 11 solar licenses is a major milestone for restoring trust in the bankability of the solar energy sector in Lebanon. Major risks stalling investments can be alleviated by implementing reforms and credit enhancement tools. In practice, trust restoration translates into large scale solar projects that could help solve Lebanon's initial energy crisis.

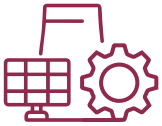
Currently, international financial institutions are still awaiting serious reforms as a prerequisite to investing in Lebanon, given the high risks related to liquidity, market dynamics, slow bureaucracy, politics, and convertibility of the revenues. However, despite not yet releasing capital flows to invest in projects, these institutions are providing the needed knowledge and supporting with technical assistance, paving the way for a promising developed sector.

RECOMMENDATIONS AND WAY FORWARD:

The roundtable highlighted the multiple facets of the energy sector and the levers to pull on to provide sustainable, stable and affordable electricity to all Lebanese. Scaling up renewables requires establishing a new energy vision for the country through: capacity building, proper planning, implementing reforms, and considering the environmental implications and associated hazards of the process. A coordinated approach among environmental actors is needed so that Lebanon fulfills its full potential in renewable energy. Considering the key messages highlighted from the panel discussion, the following steps can set the path for this shift:

DEVELOPING STRATEGIES FOR WASTE RECOVERY

Stakeholders should develop a joint solar waste recovery plan, including policies and practical strategies for the treatment of obsolete batteries and photovoltaic panels in all sectors, encompassing uninstallation, transportation, storage, recycling processes and disposal. Communities should be involved in the establishment of decentralized sorting and recycling facilities to deal with the e-waste being generated across the country. Decentralized solutions would allow better governance, management and operation of these facilities. On another level, the government needs to develop a stringent regulatory framework for the energy sector waste and ensure the engagement of the public through incentives and campaigns to avoid an irreversible solar waste wave.



REINFORCING INFRASTRUCTURE AND REGULATORY FRAMEWORK

Promulgation of the laws and decrees related to the decentralized distribution of energy should be accelerated to regulate net metering, peer-to-peer distribution through PPAs and establish the long-awaited ERA. Not only the regulatory framework needs to be established, but the energy infrastructure including grid and human resources needs to be adapted to implement the laws once ratified and ensure a transparent process that protects consumers from fraudulent practices. Lastly, regulators must clearly state whom to hold accountable for the waste generated from solar installations, to ensure that responsibilities are shared fairly and any burden does not fall on the country's most vulnerable. Another key pillar is reforms through credit enhancement mechanisms to increase the bankability of this sector and deal with the convertibility and transferability of future utility-scale renewable energy projects.

BUILDING CAPACITIES AND ENSURING QUALITY CONTROL

Capacity building programs are needed for schools, households, institutions and even businesses to help them consider the various economic and environmental implications this technology might hold. Such programs need to cover the impacts on livelihoods, agriculture, biodiversity and natural resources that could arise from land conversion to host solar panels. Technical assistance is also needed for local authorities to adopt contemporary practices, technologies and strategies. In parallel, consumers need to be empowered with knowledge so they choose trustworthy suppliers who provide reliable equipment and services. Through this approach, stakeholders will also have the chance to monitor the efficiency of the system and lead a more sustainable upscaling strategy.

LEVERAGING RESEARCH TO COMPLEMENT DECISIONS

Scientific research on the surging energy sector is essential to collect data, analyze it, make it accessible to the public, inform policies and develop evidence-based solutions. As Lebanon is witnessing a new energy reality, research, academia and organizations need to join forces and conduct extensive studies on the market by analyzing the cost of risk and the cost of financing before embarking on large-scale projects. These factors are mandatory to assess the ratio between shifts to solar energy due to a change in behavior or a suppressed demand linked to unaffordability. This research is essential to revamp Lebanon's vision when it comes to inclusive renewable energy and long-term planning.

DEFINITIONS BOX

PPA: Purchase Power Agreements are contracts between a power generator and a consumer to facilitate the sale and procurement of energy.

Net Metering: A billing mechanism that allows customers who generate their own electricity to receive benefits from the excess energy they produce and feed back into the grid.

DRE: The Distributed Renewable Energy law refers to the generation of renewable energy on a small scale. It includes key elements such as Net Metering, Permitting, standards, and Incentives.

Peer-to-peer: A decentralized energy trading mechanism where exchange happens directly between individuals or entities who generate their own energy.

ERA: The Electricity Regulatory Authority is a statutory body responsible for assisting the Ministry of Energy and Water in policies, planning, and operation.

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