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Executive

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ENERGY SECURITY

Survival through sustainability

EDITORIAL

#271

A tight margin for maneuvering

Every time I return to Beirut from a meeting in the mountains, driving down during sunset, I marvel at the reflection of the sun from the growing number of solar panels on the city's rooftops. They appear quite stunning and harmonious, as all these panels are pointing south to south-west for obvious reasons and stand as promises of a bright future that is built on renewable energy.

Yet, I also know that these urban photovoltaic (PV) installations are isolated, individual projects of uneven quality and have been born out of emergency needs, like the majority of PV panels that today cover many of the country's rooftops. While it may please our eyes from a distance and symbolize Lebanon's adoption of an energy security focus, this display of renewable energy (RE) micro-systems is actually one of many contradictory post-crises images that construct the multilayered Lebanese reality as the country is shifting from one crisis to the next.

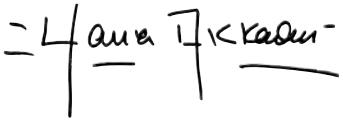
It is hard to corroborate whether the annual one billion dollars spent on solar by Lebanese households and businesses is a realistic estimate or not, but one can safely suppose that these resources were disbursed by the wrong stakeholders out of need for a secure and reliable source of energy.

It is also a fact that our country's energy infrastructure today remains in dire straits, because the Lebanese government capex on energy and all other infrastructures has been diminishing since the early 2000s. Our electricity sector has for more than 20 years consistently been topping the list of problems that have drained our national financial resources and our private sector competitiveness. The absence of an energy security focus in our public sector policies has exasperated and precipitated Lebanon's fall into the ongoing sticky financial crisis.

The mere fact that all this solar energy capacity is not connected to a national grid demonstrates again the complete disconnect between private initiatives and the state. With every state failure in addressing security whether medicine, economy, food, or energy citizens find themselves obliged to resort to short term, expensive solutions.

Meanwhile, the world is transitioning to more circular economic models. Call them inclusive models 2.0: these new models of economic circularity are built on a common understanding of public challenges and a collective participation in striving for ambitious impacts. Impacts that are as inclusive as they are profitable. Whether it is regulation-led Europe's "Fit for 55" green transition package or the technology-led and private sector reliant US approach of carbon capture, both these pathways that contribute to energy security require a multi-stakeholder approach, one that mobilizes efforts from private sector policy and execution to measurement of progress with careful watch from civil society and media.

Lebanese households and businesses, in the absence of any constructive state role seem confined to a margin of maneuvering that is far from optimal, squandering precious resources that should have been spent on growth and job creation.



Yasser Akkaoui
Editor-in-chief

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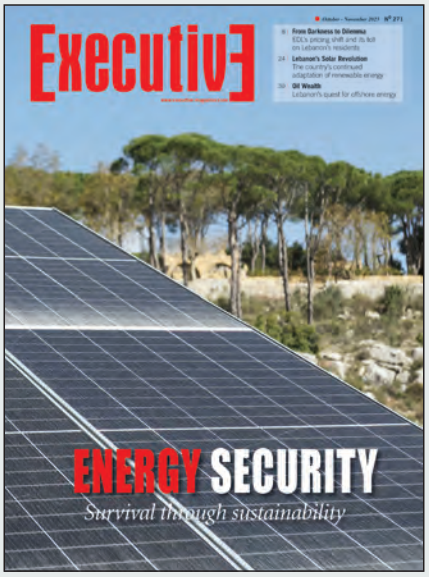
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Lebanon: a study in interconnectedness



From the idyllic early-December perspective of Beirut's waterfront promenade, with views up over Jounieh bay to the distant peaks of the Sannine range, the unseasonably warm weather and the dusty mountain flanks above a layer of atmospheric haze are not calling out for an early ski excursion. The vistas on this first Sunday of the last month in 2023 clearly invite sailing and leisure crafting off the shore, while for the many land-dwelling pleasure seekers the conditions today favor cycling, skating, and indulging in a curbside argileh encouraged by music-players. And that's what people are doing.

But such an observation, which one might have filed into personal memory as a simple indication of outdoor revelry options just 10 or 15 years ago, has in this winter completely lost its innocence. How can one endeavor to muse innocuously about weather and leisure at a juncture of time and space where less than 300 kilometers to our south another conurbation – on the exact same coast as Beirut – is being subjected to indescribable suffering? And when four hours flying time away in the other direction, about an estimated 100,000 denizens of the world are engaged in hot debates over our climate and energy future?

Or, to turn the question around into an actionable approach, nothing could be seemlier for a resident of Lebanon than to dedicate herself or himself today to efforts of thwarting war in regional arenas and to seeking constructive answers to the towering problems of mismanaging the planet and its resources on the global level. Truly, taking a proactive approach when thinking through both of these regional and global challenges is incredibly appropriate from a Lebanese perspective. In principle, this is because a determined and constructive mindset of solutions is certainly the best approach open – and the only viable approach left – to responsible Lebanese citizens at the end of another year of inactivity in the important fields of public policy making and political decision making.

A NEW RISK ORDER

The gravest risk and most immediate survival need that Lebanon finds itself engulfed in today, is of course to find a way out of the cross-border skirmishes hurting its villages and towns and out of ongoing warfare south of its borders (which had for more than a decade been preceded by a series of imbalanced and thus ultimately insincere attempts at solving the Middle East compunction) into a sustainable Arabian peace. In this regard, it seems almost superfluous to emphasize in these pages that on the Palestine front, the threat of regional conflict engulfs Lebanon as it does all people in the Near East, regardless of their religion and nationality.

The urgent quest of an Arab and Lebanese energy transition, the broad topic of this special report, poses an embedded challenge of a very different sort: with regards to global and regional needs for climate risk mitigation and climate change adaptation, Lebanon's need for developing renewable energy and implementing a smart and sustainable energy transition, is that of a very small country.

This is to say that on one hand, Lebanon's energy transition will not make a huge or even mid-sized dent in the shrinking "carbon balance" of human activities. On the other hand, Lebanon's extensive recent experiences with crises, including an energy and electricity crisis, along with its high potential for developing renewable energy (RE) sources and very quickly making an integrated energy transition, imply a national responsibility that is significantly larger than achieving energy sufficiency and equity for the people in this country.

POTENTIAL NEW LEADERS IN ENERGY TRANSITION

Therefore, it is of great significance for Lebanese decision makers and solution seekers that on the global energy front, the annual climate carnival of the "conference of parties" (COP) reached its 28th edition in an Arab setting. Held this year at Expo City in Dubai, the organizers' count on the UNFCC website lists over 50,000 registered delegates, 15,000 non-governmental organizations, and almost 1,300 media organizations.

From Dubai as the year's geographic reference point on the importance of planetary sustainability, come important climate and energy transition news to the Arab thinker.

In one example, one with direct relevance to the Arab world, a study from the International Labour Organization (ILO) trumpets that the Middle East and North Africa (MENA) region "could create 10 million new jobs, and accelerate GDP to 7.2 percent [growth] and employment to 5.3 percent in less than three decades, through strong industrial and climate development policies," with an ILO official additionally noting that "the world finds itself in the middle of an accelerating global energy transition. The MENA region has the potential to become a new leader in this transition."

This encouraging headline offers perhaps more realistic prospects to the region than an expectant tallying of UN climate-connotated funds could. Actually, as Executive's inquiries into accessible climate funding in Lebanon have reconfirmed during research for this special report, prospects for local funding appear dim when perusing literature such as the Special Climate Change Fund (SCCF), the Least Developed Countries Fund (LDCF) and the Adaptation Fund (all of 2001), the famed Green Climate Fund (GCF) of 2010, or the new Loss and Damages Fund, which after considerable and time-consuming setup quibbles, received initial pledges in Dubai on the first day of COP 28.

GOOD WILL AND UNWEILDY COLLABORATION

A Lebanese participant in COP 28 tells of good will and sincerity. But to the distant spectator of the media and press releases around the climate event, much of the energy needed for mitigating and adapting seems rife with disagreements and alarmism. Instead of demonstrating solutions and showing models of technical, political, and behavioral adaptation, many climate change responses, at COP 28 as at previous iterations, fit with the historic human pattern of addressing big challenges of the public good with verbose statements. The question is how many of all those declarations will turn out to deliver real benefits.

With energy security and climate management, it is the same question as with so many other historic calamities from starvation and pandemics to war. How many political promises will be enacted and how much of real behavior change will still be attempted by a sufficient number of people once the deafeningly loud alarm bells – and their amplification by media – have been superseded by other fears and more recent waves of news and propaganda?

What exacerbates two of our time's fundamental problems – war and climate threat – from the Lebanese perspective, is that they are interrelated.

CLEAR LOCAL PRIORITIES

For Lebanon, visibility on utilization of renewable energy and a path to energy security is obfuscated by energy multinationals (never mind that many of these corporate giants with ongoing exploration in Lebanese waters are vocal at COP 28 and yet do not provide any local interviews on their strategy and vision in a small market like Lebanon), by institutional weaknesses, and by the known obstacles to finding investments. But most of all the vision of and path to energy security is obstructed by the common trilemma regulatory and legislative failures, by politics and vain self-interests of local power players.

Not withstanding the small size of the Lebanese economy, Lebanon can contribute meaningfully to the human capacity for climate risk mitigation and climate change adaptation. But from the perspective of having to fight energy poverty for its population today, the more serious problem is that the country needs to take action. It is not in a luxury position of debating energy security under a carbon-neutral horizon, because there is no energy sufficiency at this moment.

What exacerbates two of our time's fundamental problems – war and climate threat – from the Lebanese perspective, is that they are interrelated. It is obvious that the challenges of building future energy security with a high share of RE sources and of reaching a sustainable peace in the Middle East, have this year become intertwined to a degree that makes finding a joint solution imperative.

Thus, in the context of energy security as a priority need of Arab countries – the theme of this special report and issue of Executive – the very soil and rocky ground on this eastern shore of the Mediterranean is crying out. No statement of global solidarity vis-a-vis threats of planetary nature will hold fundamental value until there is a breakthrough in liberating these lands from reiterative cycles of conflicts and mind-numbing hypocrisies of global, regional, and sub-regional power brokers. Development of humanly sustainable living by peoples in the Middle East since the end of the Cold War, have been delayed by self-interests, and worse, the disinterest, of historic participants in colonialism and various present-day global power players, towards mandating and supporting real regional peace.

Indeed, without regional peace for all peoples in this part of the world – for the last 40 years one of the two most volatile and dangerous confrontation zones on the planet – all talk about food security, energy security, social security, or improved dignity and equality, will be nothing but the noisy clanging of political cymbals or fool's bells. Thus, from the Beirut vantage point and with Lebanon as energy insecurity frontline, it is easy to see the linkages between Arab climate responsibility and the imperative of negotiating sustainable peace.

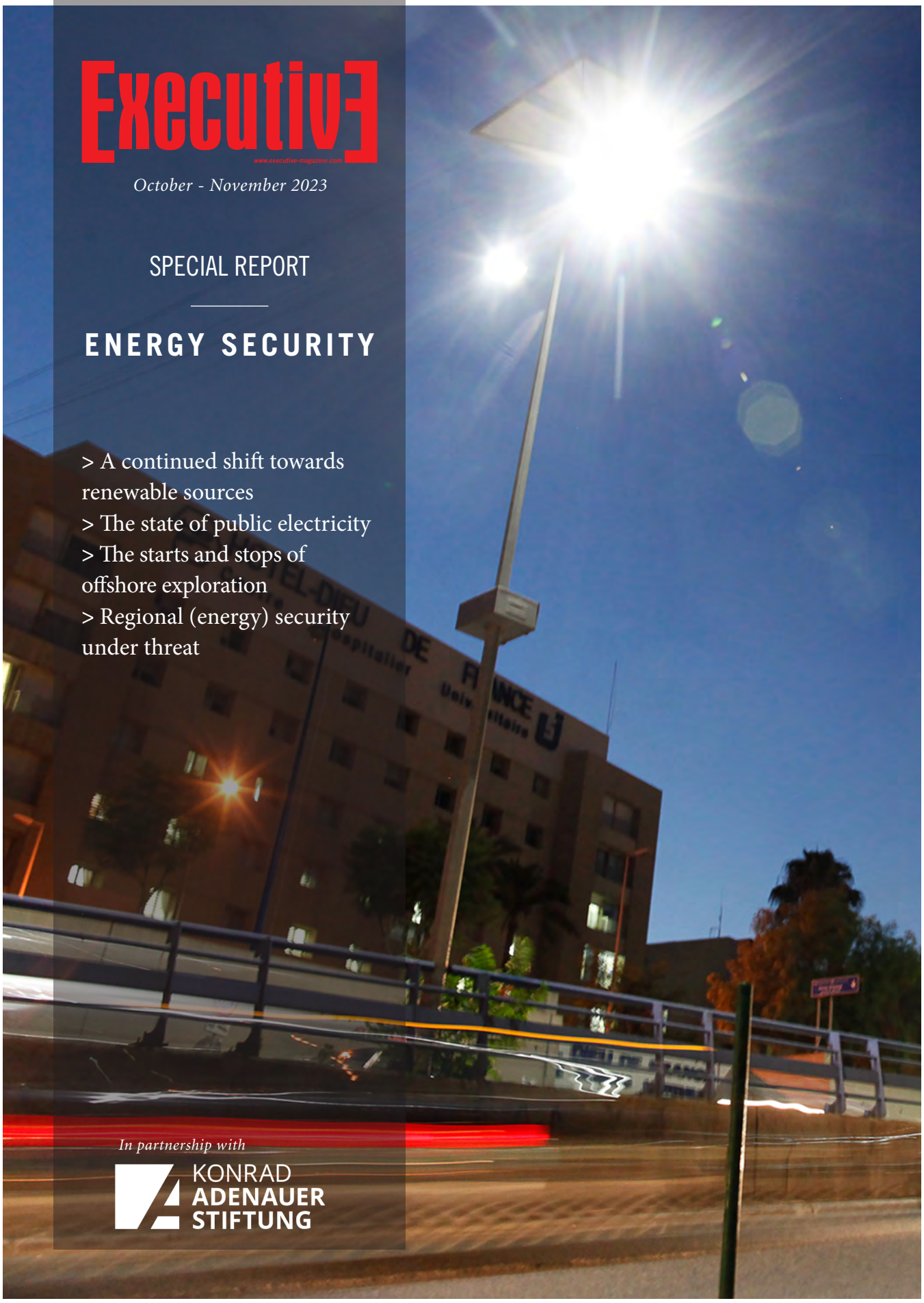


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October - November 2023

SPECIAL REPORT

ENERGY SECURITY

> A continued shift towards renewable sources
> The state of public electricity
> The starts and stops of offshore exploration
> Regional (energy) security under threat

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From darkness to dilemma

BY ROUBA BOU KHZAM



EDL'S PRICING SHIFT AND ITS TOLL ON LEBANON'S RESIDENTS

In the midst of Lebanon's power conundrum, Khaled, a schoolteacher living in northern Lebanon's Akkar region, tells Executive: "There are relatives and neighbors of ours who sold gold to install solar energy and be able to light a room and a refrigerator to ensure the health of their food, at least. Where was the state electricity at that time?" This sentiment encapsulates the frustrations and challenges faced by Lebanese households in their pursuit of reliable and affordable electricity. He goes on to address what he sees as an injustice in the taxation system. "If [the public utility] Electricité du Liban raised the tariff in exchange for providing us with electricity over a period of hours that would allow us to abandon the generator subscription and install solar energy, then the issue could have been looked at from another angle," he says. "But it's unacceptable for the taxpayer to be forced to pay the price of a service that he does not receive."

Like Khaled and his neighbors, many Lebanese live in monthly or even daily struggles for affordable power. They have in recent years had to contend with outsized electricity bills by nominally illegal private providers, or dip deeply into their savings to foot the bill for solar energy installations, usually a photovoltaic (PV) system and battery. While households grapple with the pressing issue of electricity supply in the best way they can, official state provider Electricité du Liban (EDL) has embarked on its own transformative journey of securing the country's electricity by introducing a new pricing framework. Gathering anecdotal evidence from Lebanese households and small businesses, Executive examines EDL's novel approach and dissects the cost versus supply dynamics during the pivotal Q2 and Q3 periods of 2023. The ongoing experiences of individuals from neighborhoods throughout the country portray a reality that extends beyond kilowatts and tariffs, revealing the profound impact of the nation's power struggles on the daily lives and aspirations of its citizens.

A DEFICIT THAT SPANS DECADES

Amid the profound financial collapse and economic turmoil since 2019, the Lebanese government and EDL were faced with only bad choices in their responsibility to provide citizens with electrical energy. Long practiced subsidy management of public electricity supply became fully impossible in the course of 2021, increasing energy poverty from lengthy power cuts in certain areas to an entire country without state-provided electricity for up to 24 hours, sometimes extending for consecutive days.

Strikingly, this crisis has roots spanning almost three decades, stemming from successive Lebanese governments' mismanagement of EDL, resulting in widespread power outages. Its intensification into a cloak of darkness across almost all of the national territory was furthered by escalating fuel prices, the Lebanese central bank's insufficient ability to provide hard currency for oil imports, and resulting challenges in procuring fuel in adequate quality and quantities to secure operation of state-owned power plants.

Many argue that the electricity sector stands as a key perpetrator behind the country's financial collapse. According to the World Bank, EDL has been a significant contributor to the high government debt, costing the government over $40 billion with annual losses up to $1.5 billion between 1992 and 2018.

In response to the escalating crisis, the caretaker government, led by Prime Minister Najib Mikati, convened on January 18th of this year to address EDL's status. Asserting that resolving the electricity problem could alleviate 50 percent of the country's challenges, the Mikati administration presented a plan for improving EDL operations and output. Despite the plan's initial promise to provide eight to ten hours of daily power, after three months, it proved insufficient, limiting supply to two to four hours on average.

EDL's new billing system, tying electricity costs to the fluctuating black market dollar, has led to bills exceeding 1,000,000 LL per month, a sharp nominal increase from the previous scenario where a typical monthly bill for the base monthly subscription and respective consumption fees at 10 ampere might range from 50,000 LL to 300,000 LL. Given that a monthly EDL bill of 50,000 LL in the years between 1997 and 2019 was equal to $33.34 and the 1,000,000 LL fee, based on a dollar rate of 43,000 LL to $1 as it stood in December 2022, translated into $23, it is to be noted here that the price hike in EDL charges meant a great burden for earners of lira-denominated wages and salaries but a much smaller adjustment for households with access to dollar-denominated incomes.

In addition to pre-2022 tariffs not having been adjusted since the mid 1990s, resulting in collections that were — and, according to interviewees, still are — often lagging and haphazard, the state's self-proclaimed will to reform and improve its monopoly provider EDL was highly distrusted.

In a press conference held in April 2023, the caretaker Minister of Energy and Water, Walid Fayad, acknowledged a slight relative success in the electricity plan, citing an increase in supply to a maximum of five hours per day. However, he emphasized the plan's challenges, attributing the limited success to constraints in funding from the central bank and the Ministry of Finance, along with difficulties in procuring fuel. Despite efforts to enhance the electrical supply, citizens have to cope with only four to five hours of EDL-supplied and invoiced electricity at best.

Citizens, unable to rely solely on EDL, have resorted to private generators and solar energy as their primary power sources despite relatively high fuel costs and steep upfront payments for solar installation. Moreover, when confronted with demands by private generator owners to be paid hard cash (at a rate of near 89,000 LL to $1 throughout most of 2023), heads of households are considering cancellation of EDL electricity meters. Against this backdrop of a pricey and private group of strictly for-profit providers, and a state utility that has up to this time done little to earn the trust of its consumers, it is no wonder that individuals from all around Lebanon tell Executive how they continue to apply new coping strategies in the struggle for daily access to electricity.

THE LATEST VOICES OF USERS

In Ain Al-Rummaneh, Beirut, Saeed, a 45-year-old resident, transitioned to alternative energy more than a year ago, driven by the inconsistent rationing imposed by private generator owners. Saeed says that EDL "neglects its responsibilities and allows private generators to exploit the Lebanese population." On the issue of costs, he says, "I question the logic behind receiving significant bills for minimal electricity supply," raising concerns about the cost of state electricity reaching exorbitant amounts for just a couple of hours. Emphasizing the energy self-sufficiency he acquired through solar energy, Saeed tells Executive, "I did not invest in a solar installation to become vulnerable to high bills."

Saeed's lack of trust in EDL, which he views as "overburdened and worn out," extends to doubts about the reliability and sufficiency of electricity provision. He sarcastically comments on EDL supplying electricity after midnight, a time he deems unnecessary, then states his reason for canceling the utility's meter as, "we are accustomed to its absence, so I decided to abandon this service completely."

Ali, an EDL employee who works directly in bill collection, on the other hand advises against the cancellation of meters, warning citizens about potential regrets if they choose to reverse this decision later on. Ali's rationale behind this caution is a projected increase in meter installation fees. In his view, the state meter is indispensable, even in the face of perceived service inadequacies. According to him, "citizens, despite having solar energy solutions, still require access to electricity during winter for battery charging due to frequent cloud cover."

■ Despite efforts to enhance the electrical supply, citizens have to cope with only four to five hours of EDL-supplied and invoiced electricity at best

This perspective aligns with Samar's experience — a mother of three from Aley —who installed a solar energy system two years ago, a move that enabled her to abandon reliance on generators and their burdensome bills. Samar, who recently paid two million LL for state electricity covering the months of November and December 2022, highlights how her reliance on solar energy is seasonally augmented by usage of EDL power: "I depend on solar energy for all daily activities, reserving state electricity solely to charge our solar batteries during the winter days in Aley when sunlight is scarce."

Adnan, a 60-year-old proprietor of a small hair salon in Aley, echoes the struggles of those grappling with the electricity crisis. Having paid $40 for state electricity covering December and January, Adnan expresses frustration at the predominantly nighttime supply that does not cover hours when customer traffic is highest. For Adnan, installing solar power is not only impractical in the foggy area of Aley where he works, but also expensive, with a system of ten am-

pere requiring an upfront investment of $4000. Adnan highlights the inadequacy of a $100 subscription fee for a five-ampere generator, prompting him to invest in his own generator, a crucial asset for 90 percent of his business, despite the diesel costs of around 100,000 LL per customer, which amounts to around $1.10 at the time of writing.

For Nancy, a student who hails from the Hasbaya region in southern Lebanon where her family's home receives three to four hours of electricity per day, the case of EDL is one of deliberate avoidance of responsibility. She and her siblings see a stable electricity supply as "essential for our studies, charging phones, laptops, and accessing the internet," she tells Executive, adding that her parents bear this increased cost. "In our area, we rely on the uninterrupted subscription of a generator, where the cost increased to $55 from the initial $35," she adds.

EDL'S (RE)ACTIONS OF 2023

When EDL initiated the implementation of a new pricing system on November 2, 2022, with bill issuance commencing in February of 2023, it intended to combine a migration to a financially sustainable utility with a strategic move to curb network infringements. The intricacies of this pricing structure were detailed in a statement released by the corporation in November of 2022. The new scheme prices ten US cents for each of the first 100 kilowatt hours, followed by 27 cents for each kilowatt-hour exceeding 100. Additional charges include a fixed monthly tariff of 27 cents per ampere and a qualification allowance of $4.3 for subscriptions previously set at 5,000 LL per month, doubling to $8.6 for subscriptions calculated previously at 10,000 LL per month (which before 2019 equaled to $3,34 and $6.68, respectively).

The corporation clarified that the lira pricing would reflect the dollar exchange rate determined by the central bank. It added that its tariffs would be subject to adjustments every one or two months, under an aim to align prices to end users with real production costs based on global oil and oil derivatives prices.

However, in another statement, EDL disclosed that bills issued for electricity consumption in November and December of 2022 were calculated based on the exchange rate on the Sayrafa platform plus a 20 percent surcharge, amounting to 43,600 LL to the dollar. By this writer's understanding, this calculation methodology persisted despite fluctuations in the exchange rate at the end of 2022.

Throughout the year to date, the corporation tire-



lessly reiterated that it cannot sell electrical energy without collecting its dues. In the most recent "final warning" to date, EDL called on public administrations to settle their electricity consumption bills, threatening electricity cutoffs for those defaulting.

Despite state promises to provide eight to ten hours of power per day under the emergency electricity plan from earlier this year, the reality remains stark. Subsequent to the announcement of the emergency plan, the central bank decided to limit financing advances on purchases of fuel for electricity production from $600 million to $300 million. In turn, EDL issued a warning to ministries and public administrations demanding cash payments in Lebanese pounds and not through bank transfers, giving an ultimatum of October 24 before starting to disconnect services to unpaid accounts.

A source at EDL emphasized the irreversibility of this warning to Executive, highlighting the need to combat inefficiencies, especially as EDL activates collections targeting Palestinian and Syrian refugee camps. As state institutions face mounting bills, and households grapple with insufficient power, critics argue that a new pricing system doesn't resolve decades of mismanagement, and falls short of addressing the issue of inadequate supply.

While Lebanon has passed through another promising summer followed by both an unexpected regional shock and a continued absence of political reform, EDL's pricing shift did not dispel the fears of the Lebanese, including Khaled from Akkar. He stresses that "regardless of the new tariff, there is no guarantee that the emergency plan will continue. If it stops, the citizen will remain obligated to pay the subscription fee without enjoying a moment of electricity!"

Some interviews have been translated from Arabic to English; names of a few individuals, whose identity is known to Executive, have been changed upon their request.

NEW INTERIOR



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Vintage wine cellar

Measuring solar at work

BY CAROL FARAH



CORPORATE TRANSITIONS TO RENEWABLE ENERGY

In the lineup of governmental duties, ensuring a stable electricity supply is a basic expectation. However, in Lebanon, depending on the government for reliable power has become an unpredictable proposition. The country's businesses have long been self-reliant, resorting to their generators to meet their electricity needs. Yet a notable transition unfolds as numerous Lebanese companies adopt renewable energy (RE) solutions.

Those Lebanese businesses, which in recent years embarked on to greater reliance on solar energy, have undergone a financial evolution, observing significant monetary and environmental savings in the course of their transition. Their moves toward sustainability are evident in noteworthy decreases in CO2 emissions and diesel consumption. This transformation has been facilitated through diverse channels, including active participation in funding projects and judicious securing of loans.

As many Lebanese companies seek to adopt RE, this analysis looks at three Lebanese companies operating in the manufacturing and agro-business sectors to understand their motivations for transitioning and assess how their businesses are benefiting from this shift in various ways, as well as the impact of their sustainable practices on their operations and the broader industry landscape.

GENERATOR INVESTMENTS TO SOLAR INSTALLATION

Even before the 2019 crisis, state electricity failed to reach the industrial zone in Bchamoun, Mount Lebanon, where Beesline, a cosmetics manufacturer, is located. "We've always depended on generator suppliers for electricity," says Mohamad Mouhaidly, technical and facility manager at Beesline. However, at the beginning of 2022, the company faced issues with the generator provider over increased prices and service interruptions. Subsequently, Beesline decided to buy its own generators to have more stability and autonomy. "Our two-shift production relies on continuous electricity; any interruption disrupts our workflow," adds Mouhaidly.

Beesline's sustainability department, driven by the company's policy on environmental care, and animal testing-free products, initiated a reevaluation of continuous generator use and reliance on diesel. The discrepancy between the company's vision and their means of production, in addition to the inconvenience and high costs of generator fuel, prompted them to consider transitioning to RE to reduce CO2 emissions.

The Country Entrepreneurship for Distributed Renewables Opportunities (Cedro 5), a program initiated by the UNDP in Lebanon and currently in its fifth phase of deployment, focuses primarily on promoting sustainable energy and resource efficiency. It aims to enhance the use of RE sources and improve energy efficiency across various sectors. For Beesline, participation in the Cedro 5 project provided the essential financing to enable its shift to RE in 2022.

PRE-CRISIS FUNDING FOR RE

For Balkis Orchard, a fruit-growing and juice-producing agrobusiness in southern Lebanon, and Sanita, a manufacturer of paper products in the Byblos district and part of the INDEVCO group of companies, the move to RE took place earlier. In 2017, Balkis made a significant stride towards sustainability by installing a photovoltaic (PV) system of 600 solar panels. The initiative was funded by a loan from Banque Du Liban (BDL), the Lebanese central bank, which aimed to incentivize industrialists in Lebanon to embrace RE sources. With fuel costs on the rise,

Balkis Company saw an opportunity to reduce its reliance on diesel-powered energy.

Balkis' transition to RE served a dual purpose within its agricultural framework. A notable portion of their energy allocation is dedicated to irrigating extensive orchards to ensure the vitality of their produce, while the rest powers machinery and essential refrigeration units that are crucial for their industrial operations.

Ali Beydoun, the company's commercial director, tells Executive that "Balkis utilizes an off-grid solar system that generates electricity directly from sunlight, primarily during daylight hours." This system functions without batteries, harnessing solar power exclusively when the sun is shining. The solar system and the generators or the main power grid (EDL in this case) operate together, supplementing each other when needed. Consequently, when solar energy is not sufficient during periods of cloud cover or at night, the company relies on its generators for power. However, with the integration of the solar system, their dependence on the site's larger generator has significantly decreased in the last six years.

"There's always juice in the making, and it needs to be stored between zero to four degrees Celsius, requiring continuous energy. Even the raw materials and the cartons used for packaging the juice must be stored in a controlled climate, in a cool place with substantial air conditioning," explains Beydoun regarding the continued need for generators.

For both Beesline and Balkis, generators moved from a primary energy source to a backup. Mouhaidly tells Executive that even if Beesline is utilizing solar energy, it cannot fully phase out its generators since they remain essential during cloudy days and when operating night shifts. However, he maintains that a full transition to renewable energy is "a dream we wish to see fulfilled."

Sanita's pivot to RE also occurred in 2017, but in this case the financial loan was provided by Bank of Europe. Employing surplus space at its seaside manufacturing site, Sanita implemented a PV system that Wissam Abi Diwan, Sanita's general manager, describes as "the largest privately owned renewable energy system in Lebanon."

A QUESTION OF EFFICIENCY

When asked about the system's efficiency, Abi Diwan explains that "during our busy workdays, when all our machines are running, solar energy covers about 25 percent of our energy requirements." He adds that "on less demanding days when not all machines are operational, solar power steps up and fulfills 50 percent of our needs." Emphasizing the versatility of solar energy, he explains that "during periods when our machines are completely idle, Sanita channels the unused solar energy from its system to support a sister company's electrical needs. It's a smart way to ensure that the surplus energy doesn't go to waste and benefits another part of [the group's] operations."

In addition to increased energy efficiency, Sanita has achieved notable savings in electricity consumption over the last six years since adopting RE. At the time of this writing, the company is saving 3,500 kWh daily. Through managing to secure a rate of $0.36 per kWh, Sanita has had daily savings of $1,260 since 2017 compared to their previous expenses on conventional energy sources.

For Balkis, solar energy covers 30 to 35 percent of its needs, producing up to 300 MWh annually and saving 1,800 tonnes of CO2. As for the maintenance of their solar panels, they monitor their renewable energy system online. When the system's output decreases or isn't consistent, they investigate potential causes, primarily checking for any dust accumulation on the panels. "This occurrence isn't frequent; it has happened two to three times since we switched to solar in 2017," says Beydoun.

For both Beesline and Balkis, generators moved from a primary source to a backup.

Marianne Itani, the sustainability manager at Beesline, tells Executive, "our company made it to 55 percent green energy with 15 percent for water heating and 40 percent for electricity."

Itani adds that they aim to reach 75 percent green energy by late 2024 or early 2025 by expanding their solar initiatives with another round of support from UNDP as they plan to participate in the Cedro 6 project.

Beesline began their renewable energy transition with solar water heating, which is crucial for their cooking, cleaning, and product-making processes. "We initially aimed to also start our solar PV project in 2022," Mouhaidly explains. Yet due to some technical issues, they commenced at the beginning of 2023. Mouhaidly highlights that this delay was necessary for them to implement system updates to ensure maximum efficiency.

AMORTIZATION OF INVESTMENTS

"Switching to renewable energy has been the best decision for us and the environment. It's a win-win situation," says Itani. Considering that their annual savings range from $60,000 to $70,000, the company foresees recouping its investment in the renewable energy project within a three-year time frame.

In the realm of energy management and environmental impact, the data given by Beesline reveals notable improvements in both energy efficiency and carbon emissions. From January to June, energy consumption per tonne of production decreased from 531 kilowatt hours (kWh) in 2022 to 369 kWh in 2023, indicating enhanced operational efficiency. Concurrently, carbon emissions per tonne of production saw a reduction from around 230 kg in 2022 to 160 kg in 2023. Despite a slight increase in total carbon emissions (92,400 kg in 2022 to 93,015 kg in 2023), the context is significant: this emission level is equivalent to the energy use of approximately 12 households for an entire year. These metrics collectively signify progress in resource optimization and environmental sustainability within the assessed timeframe.

■ While RE is essential, "it's not a complete solution; even other countries don't rely entirely on it"

According to data from Apave Group, a risk management firm in Beirut, Beesline saw zero percent green energy savings from January to June 2022. However, in August 2022, there was a notable transformation as the company adopted a more sustainable approach, with nearly 91 percent from fuel energy and nine percent from solar water. This positive momentum persisted, as by January 2023 there was only 49 percent reliance on fuel energy and substantial contributions from solar PV and solar water. The average green energy percentage for the first half of 2023 stands at 58 percent, surpassing the targeted 55 percent.

CORPORATE ENVIRONMENTAL AWARENESS AND THE LIMITS OF SOLAR POWER

Beesline's Itani says that environmental consciousness extends beyond RE, asserting that "by next year, eco-friendly packaging will adorn the shelves of stores across Lebanon." Itani tells Executive that they also plan to introduce refillable bottles, adding that strong marketing is needed as currently, "Lebanese people are not used to that."

In regard to other environmental considerations for Balkis, Beydoun says, "The downside of our renewable energy project was that we had to cut a few trees to make space for the panels. However, we've positioned the panels on elevated bases, allowing for potential planting in the future, though not trees." He emphasizes that the company's environmental consideration doesn't stop at RE. "The one-liter cartons we use for our juices originate from a sustainable forest in the US. For each tree harvested, many more are planted in its place."

Most companies in Lebanon that have started the transition to RE, like the ones discussed in this analysis, still find themselves unable to phase out generators completely. Even so, Itani suggests that companies relying solely on generators need to reconsider. "Seek support, make the switch, save money, and help the planet," she says. Abi Diwan echoes this sentiment. "Solar energy, especially for the business community, can be the solution to Lebanon's electrical crisis, since many businesses in Lebanon operate during the daytime. They can actively participate in funding projects, or they can jumpstart their utilization by obtaining a loan, which they can return using the financial savings achieved from the project." However, Beydoun, while acknowledging the increasingly critical need for an RE overhaul in businesses, maintains that while RE is essential, "it's not a complete solution; even other countries don't rely entirely on it." He further comments, "Considering the status of state electricity in Lebanon, a solution seems distant. Companies might contemplate transitioning to renewable energy, yet the decision depends on their business type."

Lebanese businesses are flipping the switch in unique ways when it comes to renewable energy, eschewing a one-size-fits-all scenario by adopting renewable energy through varied approaches based on their distinct needs, financial capabilities, and the support available to them. Whether through loans or self-funding initiatives, these businesses navigate varied paths to transition. Their utilization of RE ranges from systems dependent on batteries to those exclusively relying on direct sources. Yet, the underlying catalyst for this pivotal shift lies in Lebanon's historical electricity crisis, a chronic issue predating the recent turmoil. Pervasive reliance on generators is giving way to a greater shift towards renewables, with companies reporting substantial financial and environmental gains, marking a turning point in sustainability and stability within an energy-stricken context.

Lebanese communications talent Carol Farah teamed up with Executive for an internship in business journalism after her successful completion of studies at the Lebanese University

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False promises of improvement

BY MICHAEL MAALOUF



THE LEBANESE ELECTRICITY SECTOR AND LOST REGIONAL ENERGY AGREEMENTS

The Lebanese authority's failure to manage the electricity sector is not a new phenomenon for the Lebanese people as electricity shortages have been prevalent in their daily lives for the past 30 years. The internal disputes within the Lebanese government along with the negligence of its institutions left the state-run electricity company Electricite du Liban (EDL) to be a major example of a failed institution. However, with the beginning of the economic crisis in October 2019, the performance of the EDL worsened. Multiple factors, including ongoing political disputes, the COVID-19 pandemic, and the August 4, 2020 explosion at Beirut Port, exerted heavy pressure on the economy and hard currency reserves. Driven by these pressures, inflation rates in Lebanon kept on increasing and reached around 228.85 percent by August of 2023 according to a report conducted by Blom Invest in that same month. At the same time, people's purchasing power and EDL's income were hit by the depreciation of the Lebanese pound, with significant impacts on EDL's ability to produce electricity and on the people's ability to pay for it.

Jumping forward to the situation at the latter part of 2023, access to electricity services remains a conundrum amidst still high inflation rates and dwindling real incomes. Paying for power to light their homes and run their appliances has become more difficult for locals (see story on page xxx) who already have to pay for commercially operated generators to fill the gap of the EDL, which at its full capacity provides only 12 hours of electricity a day, a number that is not reached in most cases.

The EDL's electricity currently covers three to six hours on average depending on the area. There are very few areas that exceptionally have a high number of hours of electricity coverage such as Jezzine district, which is at an average of 14 to 20 hours. In a March 2023 study conducted by Human Rights Watch and Consultation and Research Institute (CRI) which covered 1,200 households, it was found that the cost of electricity has affected nine out of ten households' ability to pay for other essential services. Low-income households were mostly affected by the rising costs as they had to sacrifice other essentials that they were barely even able to access. Furthermore, the study showed that amongst the poorest 20 percent of households, one in five cannot afford access to a generator which is the sole available source of a more stable electricity supply.

A FRAUGHT LANDSCAPE FOR ATTEMPTED SOLUTIONS

While there were no large-scale projects to deal with the intensifying electricity crisis by the Lebanese Ministry of Energy and Water, certain agreements were supposed to take place to kickstart major projects. One of these major agreements was signed on January 26, 2022 by Lebanese, Syrian, and Jordanian officials that entailed supplying Lebanon with electricity from Jordan via Syria. The agreement, which would have provided 250 megawatts of energy for Lebanon, was supposed to receive $200 million in funding from the World Bank. Furthermore, this agreement was part of two US-brokered agreements which were supposed to address Lebanon's severe electricity shortages. A second agreement was signed by Lebanon, Syria, and Egypt on June 21, 2022 to supply Lebanon's power plants with natural gas from Egypt. The gas was supposed to pass through the Arab gas pipeline, which starts from Egypt, continues through Jordan, and then reaches Lebanon via Syria. At the signing ceremony, Minister of Energy and Water Walid Fayad told the press that around 650 million cubic meters of gas would be brought to Lebanon through the pipeline annually to the Deir Ammar power station in the north. Media reports have even claimed that Syria and Lebanon undertook renovation on select parts of the pipeline before the agreement stalled. Until today there have been no updates by the Lebanese government on the status of these agreements. When approached by Executive, the Ministry of Energy and Water declined to comment on the matter.

According to Marc Ayoub, an energy policy researcher at the Issam Fares Institute for Public Policy and International Affairs (IFI), the failure of these agreements was caused by a combination of geopolitical factors and the mismanagement of the Lebanese government. "The absence of progress in these energy agreements with Jordan and Egypt goes beyond the Lebanese government's failure as it is also related to the complex political situation in the region," he tells Executive.

In fact, the agreements were proposed by Dorothy Shea, the U.S. ambassador to Lebanon, only weeks after Hezbollah in 2021 announced a plan to import fuel supplies from Iran. The move was viewed by observers as a bid to counter Hezbollah's strategy to provide fuel. The passage of electricity through Syria sparked internal division in the U.S. Congress as the Caesar Act–legislation that places sanctions on the Syrian government–is still active.



Ayoub notes that even so, the agreement was used as a point of persuasion by the U.S. envoy Amos Hochstein during the negotiations over the sea border between Israel and Lebanon. However, Ayoub points out that with the latest war in Gaza, the political atmosphere made it almost impossible to move forward with the agreement.

As per Ayoub, the Lebanese government did what it could to move forward with the deal, but a set of political complications led to stagnation. Funding for the deal hinged on whether the Lebanese government could meet the conditional demands of the World Bank. One World Bank stipulation required the EDL to increase electricity bills (see story on page 8). Although the EDL followed through, they failed to meet the World Bank's requirement of enhanced bill collection, as they were unable to collect fees from various areas.

> Until today there have been no updates from the Lebanese government on the status of these agreements

In addition to facing political barriers in the US and being hampered by operational conditions at EDL, Dr. Patrick Mardini, the CEO of the Lebanese Institute of Market Studies (LIMS), tells Executive that the project of relying on imported fuel or electricity from nearby countries under the circumstances prevailing in 2022 and the first nine months of 2023 is in itself not a viable idea. Mardini's rationale is that the financial constraints faced by the Lebanese government would not allow it to continuously fund the electricity supplies from Jordan and gas from Egypt that were supposed to be financed by the World Bank at the initial phase.

Mardini says that he does not see the problem as solely political or tied to the Caesar Act as Fayad claims, but rather a problem of the government's noncompliance to the World Bank's demands, especially when it comes to establishing a regulatory authority. Even though there are conflicting views over the cause of the failure to establish the ERA in the more than 20 years since its legislation, there is no doubt that the agreements have completely failed.

Moreover, based on the data from Lebanon's central bank, the Banque du Liban (BDL), which extends until March 2023, the electricity output of the EDL continues to deteriorate. According to Mardini, in lieu of absent government support, outputs have become mostly reliant on the risky solution of arranging fuel deals with the Iraqi government. Maintaining a continuous supply of fuel from Iraq became harder to finance, especially after the step taken by the BDL's Deputy Interim Governor Wassim Mansouri to put an end to money lending from the central bank to the Lebanese government.



■ Even though there are conflicting views over the cause of the failture, there are no doubts that the agreements have completely failed

NEXT STEPS?

Faced with these challenges, reaching a resolution for the recurring electricity problem seems difficult. Mardini suggests that "the only solution for the electricity sector in Lebanon is to move forward with a privatization process of the country's electricity sector and take away the full control from the Lebanese Ministry of Energy and Water on electricity services." In this context, Mardini saw that the revival of Law No. 462/2002 as necessary. The law aims to dismantle EDL's monopoly, dividing the sector into three areas: production, distribution, and transmission. Also, introduction of independent power producers (IPPs) and electricity distribution companies (EDCs) into the sector would involve creating a wholesale electricity market where IPPs compete to sell electricity to EDCs, who, in turn, sell it to the broader market. "The ministry has been resistant to these changes and has been seeking funding repeatedly and relying on unreliable solutions such as fuel imports," Mardini tells Executive.

Ayoub asserts that "given the current political turmoil in Lebanon, which has left the country with an interim government and without a president for a year, it would be impossible to implement the solutions that are needed to revitalize the sector." He further notes that "with time, people have become more reliant on renewable energy, and commercial generators are an aspect that will eventually shrink the size of outputs required from the EDL in the future."

The future of the electricity sector appears grim given Lebanon's ongoing political paralysis and the Ministry of Energy and Water's reliance on unsustainable solutions that are barely enough to keep EDL afloat. As the local population cannot afford to wait for resolution of these issues, they are pushed to look to individual and collective solutions to meet their energy needs as the only viable option to deal with constant electricity shortages. However, since the steps taken by the local population, such as solar panel installation, are relatively new, taking such initiatives to the community and municipal level would require a process of trial and error before they could be relied upon more broadly and inclusively. Therefore, innovation is the only way that the Lebanese people will be able to secure their energy needs in the coming years.

Michael Maalouf is a freelance journalist

Visions of transition

THE LEBANESE DREAM OF ENERGY SUFFICIENCY AND SECURITY

An energy transition requires a lot of – energy. This insight is a truism. But it is not a problem of circular reasoning, which would be saying that energy security is unachievable without tapping into new sources of energy through use of terrestrial assets such as wind and water, responsible activation of yet-to-be-discovered extractable sources, as well as focused and heavy reliance on heat and light from the sun.

The journey of turning the vision of sustainable energy security into reality in Lebanon should include private and public production of energy – ramping up diversified production through joint partnership (PPP) projects but also through separate initiatives; but equally it will require reducing energy wastage as well as auditing and rationalizing energy consumption – the conservation of the energy we have at our disposal and have been wont to squander. Besides restructuring the electricity sector, the journey further needs to pass sustainability checkpoints related to two other, top energy-gobbling sectors, transport and housing. Last but not least, it requires a transparent and reliable sector of financial intermediation and access.

But above all material investments and physical efforts, the energy that is essential in realizing any dream of Lebanese transition to a complex and comprehensive state of security, one that includes but reaches beyond food security and energy security, can and must be captured firstly through collective and individual mentality changes.

Constructively capturing and activating the vision of energy security in a country of long energy insufficiency and, currently, acute depravation of electricity must start on the frontlines of the mind – we can do it, but only by investing our human energies of behavioral change, regulatory development, administrative adoption, state incentives, market incentives, corporate responsibility, civil advocacy, education across all levels from kindergarten to vocational, tertiary and adult, as well as cohesive political will – Lebanon's most vulnerable and elusive energy source – and communications media support.

LIST FOR ENERGY VISION



■ Constructively capturing and activating the vision of energy security in a country of long energy insufficiency and, currently, acute deprivation of electricity must start on the frontlines of the mind

Lebanon's solar revolution

BY ROUBA BOU KHZAM



LEBANESE ADAPT SOLAR ENERGY WHILE KEEPING CONVENTIONAL BACKUPS

Samar Monzer has connected her refrigerator and illuminated her house. As she stands in the kitchen, baking a cake for her three children, she savors the renewed sense of comfort in her Aley residence-nestled in Mount Lebanon, now completely powered with electricity.

In late 2021, Monzer, a Lebanese homemaker and mother, opted to allocate $4,000 from her family's savings to acquire a photovoltaic (PV) electricity system of eight solar panels and six batteries. "Our aim is not to lead a lavish life; we merely aspire to live with dignity," she tells Executive.

This financial commitment enabled her to discontinue her reliance on privately-owned diesel generators, which typically provide electricity to the majority of households in Mount Lebanon. She expresses, "I have now returned to a routine life—I can do laundry, cook, enjoy TV, and charge my phone at my convenience."

The struggle for a stable and reliable national grid has been a saga spanning decades, tracing its roots back to the onset of the Lebanese civil war in 1975. At the center of this quagmire stands the state provider, Electricité du Liban (EDL), grappling with financial tribulations and political entanglements that hamper its ability to ensure an uninterrupted power supply. The consequence? Rolling power cuts, interspersed with irregular blackouts, became an exasperating norm, catapulting the nation into an even more pervasive reliance on private generators. Yet, this makeshift and not actually legal solution turned into an entrenched system, bringing its own host of challenges, including intransparent and sometimes extortional usage charges and grave costs for environment and air quality.

After the dual system — of nominal monopoly provider EDL and powerful generator operations with political tutelages — had been dominating the provision of electricity to Lebanese households for many years, October 2021 plunged the country into complete darkness in a stark manifestation of Lebanon's economic crisis that had been raging already for more than 18 months. The main government-controlled power stations, Deir Ammar and Zahrani, ran out of fuel. This catastrophic, EDL-wide blackout rendered private generators the sole lifeline for power. In the capital Beirut, the scenario of long daily blackouts lasted for over a year and a half, with EDL managing to provide a mere three to four hours of electricity per day, as confirmed by a policy statement published by the Lebanese Ministry of Energy and Water under the title "Setting Lebanon's Electricity Sector on a Sustainable Growth Path."

This energy predicament was just one facet of Lebanon's crisis, which unfurled in 2019 with an economic and currency collapse labeled by World Bank Group researchers as "one of the top ten most severe economic collapses worldwide since the

1850s." The repercussions reverberated with an inflation rate soaring to 171 percent in 2022, according to the Central Administration of Statistics in Lebanon. One curious outcome emerged, however: the collapse of public electricity has prompted an accelerated shift to solar energy.

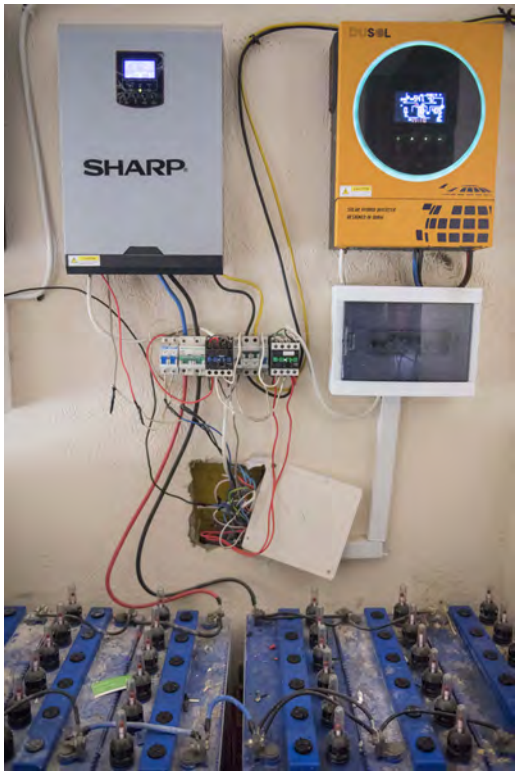
BROAD FLIGHT INTO PRIVATE SOLAR

Prior to 2021, the installation of solar panels in Lebanese households was largely motivated by ecological concerns, akin to trends observed in European countries. However, beginning in 2021, the landscape shifted dramatically, transforming solar panels from an environmental statement to a pragmatic means of securing energy. "This shift is a direct response to the challenges stemming from the diminished output of both Electricité du Liban and private generators. This underscores the significant evolution in solar capacity, starting at a cumulative total of 100 megawatts (MW) in 2016 and experiencing a remarkable surge, reaching an unparalleled 1,000 MW in 2023 within just seven years," says Walid El Baba, an engineer and the president of the Lebanese Solar Energy Society (LSES).

Starting in 2021, generators, often under private ownership, had functioned as a nearly constant replacement for electricity derived from the national grid, leading to exceptionally high electricity bills. Monzer reveals that prior to adopting solar energy, her monthly experience felt like an unending, increasingly painful negotiation with private generator providers. These providers consistently escalated the monthly bill to provide a mere five ampere, which proved sufficient only to power a single light in one room and the refrigerator. Any additional load would cause the generator to abruptly cut off.

In 2022, Lebanon witnessed a continued transformation favoring renewable energy sources, as solar energy projects, as reported by the Lebanese Center for Energy Conservation (LCEC), achieved a cumulative capacity of approximately 870 megawatts. Notably, 663 megawatts were added in that year alone, pushing Lebanon beyond the 1,000-megawatt mark. This milestone comes as the country struggles to function under a total electricity demand of 1,700 megawatts, as estimated by the LCEC in June 2023.

According to the International Renewable Energy Agency (IRENA), Lebanon has the potential to derive 30 percent of its electricity from renewable sources by 2030. The shift towards solar energy has had a profound impact, reducing dependence on generators—a significant revelation emphasized in the Human Rights Watch's March 2023 report. The report reveals that, between November 2021 and



January 2022, Lebanese households allocated 44 percent of their monthly income to meeting their electricity needs, mostly by paying generator charges. In contrast, investing in solar panels provides a long-term solution safeguarding against blackouts and escalating electricity prices.

Solar energy, though effective, has a substantial upfront cost with a broad range depending on quality and quantity that renders it inaccessible to some. Post-installation, continuous monitoring incurs ongoing expenses, extending the financial commitment. "Investing in solar energy is not just about installation; it's a commitment to consistent maintenance. The more care you put into it, the more sustainable and cost-effective it becomes," Joseph Al Asmar, an energy expert and faculty member at the Antonine University (UA), tells Executive. This commitment includes regular inspections of PV panels, cleaning to remove dust or debris that may hinder efficiency, checking electrical connections, and ensuring the proper functioning of components like inverters.

> "Investing in solar energy is not just about installation; it's a commitment to consistent maintenance"

"The cost of a solar energy system varies based on factors like panel quality, battery efficiency, and

■ To prevent accidents, strict adherence to precise technical conditions, use of high quality equipment, and enlistment of experts is crucial

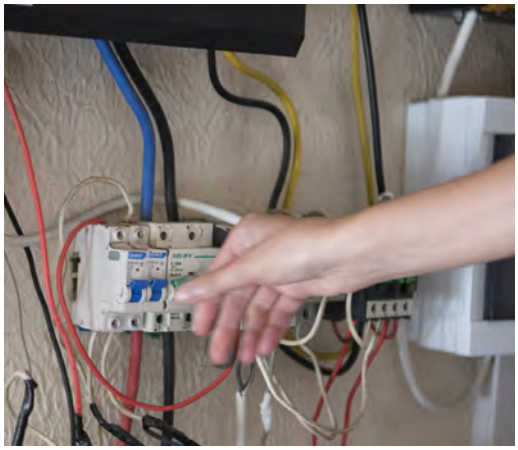
optional features," says Al Asmar, adding that, "it's a personalized calculation to meet specific customer needs and ensure a cost-effective and efficient solution."

SAFETY IN LEBANON'S GROWING SOLAR INDUSTRY

The propulsive surge in Lebanon's solar energy industry has led to an increase in haphazard and unskilled installations, resulting in frequent safety incidents across regions. Al Baba highlights challenges in installation processes, noting that "around 30 percent of energy installations face issues, posing potential dangers, including fires." These problems stem from flawed connection methods, the use of unsuitable cables, the absence of the MC4 connection leading to panel ignition, and improper panel placement causing defects in energy production. Al Baba stresses the significance of PV training sessions offered by the LSES for workers to tackle challenges and guarantee the safety and efficiency of solar energy systems. Additionally, he stresses the LSES acknowledgment of Eco Truck since 2012. This mobile sustainability classroom, designed for students in both private and public schools, has hosted numerous visits. Al Baba notes, "The truck is equipped with PV panels, a wind turbine, solar heating, and various other features."

To prevent accidents, strict adherence to precise technical conditions, use of high quality equipment, and enlistment of experts to assess loads, ensure proper cable connections and undertake appropriate installation is crucial. Al Asmar underscores the significance of experience and knowledge in this domain, emphasizing that "the installation is not akin to ordinary electrical devices; it involves an intricate energy production system that necessitates adherence to scientific and engineering conditions." This entails coordinated efforts among dishes, cables, transformers, and batteries to align with the engineering carrying capacity of the house.

Highlighting the importance of protection and safety measures, Al Asmar sees a priority need of proper maintenance in future dealings with already



installed solar PV systems. He further evisions for all systems, those yet to be installed as well as those installed during the demand surge of the past three years, the implementation of regulation to shield each system from lightning strikes, high currents, and excessive traction beyond the system's capacity.

While Al Baba expressed optimism regarding the future of PV solar installations in Lebanon, he emphasizes a dual need for intelligent utilization and the importance of a well-planned network that caters to the needs of every user, from the smallest to the largest. His concerns about the RE sector's development in the coming years originate in the unregulated infrastructure as well as the behavior factors, namely the perceived selfishness of the Lebanese population, expressed in what he views as a tendency to prioritize individual interests over the collective good.

In regard to regulatory concerns, which are shared by many experts on RE in Lebanon, the current bottomline of Lebanon's compulsive rush towards renewable energy in the past three years points to a strong legal foundation as the linchpin for future RE success. The failures of EDL and the parliamentary and ministerial failures to rapidly exert governance and order over the wild environment where the urgent need for affordable electricity could lead to reckless installation of solar PV, have resulted in a practical and moral imperative of a collective effort from government, private sector, and civil society to invest in and adopt sustainable energy practices. For Al Baba, what is most needed now is a focus on legislation to streamline the transition, warding off chaos. He emphasizes: "electricity isn't just a commodity; it's a fundamental human right."

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INTRODUCTION: NO ENERGY LEFT TO WASTE

Harnessed energy constitutes the juice of life for industrial and post-industrial, knowledge and information based, economic activity. Crucial for our quality of living, electricity powers, among other things, our refrigerators, washing machines, LED lights, and domestic shrines to entertainment. It powers industrial equipment, whether programmable machine tool solutions – the machines used to make tools and precision parts for other machines – or the most powerful or most efficient electricity-driven manufacturing units. It is indispensable for the knowledge economy and information societies in the 21st century, with electricity driving computers and communication networks and even the transformation of money (remember, for example, how big an issue electricity is in the context of cryptocurrency exchanges and Bitcoin mining).

Without continued economic growth, the dispersal of economic equality and achievement of universal societal wealth, both within and between countries, is unachievable. But economic production is only one, and sometimes brutally overemphasized, factor in human existence and the wellbeing of our species. What the universal role of electricity in shaping the quality of our mundane lives and the reliance on it for economic production and productivity also mean, however, is the inescapable presence of irresponsible use. Thoughtless squander, and even deliberate abuse of this essential ingredient is rife in modern times. Alongside the fact that most of energy is expended in the production of energy, the wasting of this resource makes rationalizing electricity usage a crucial need for future economic growth and for the preservation of living quality.

Alongside the fact that most of energy is expended in the production of energy, the wasting of this resource makes rationalizing electricity usage a crucial need for future economic growth and for the preservation of living quality

Part of such a rationalization are energy audits, improvements in the efficiency of our everyday appliances, upgrading household electricity conduits, investments in advanced machinery and methods of production, and adoption of optimal power solutions for public venues, institutions and systems. Such rationalization efforts, which by Executive's past observations were often driven by corporate need for savings but led by energy consultants and academically inspired tech startups, can be found in Lebanon, albeit historically not in the needed, broad coverage of private and public life.

RESPONDING TO THE CHALLENGE

Under the current challenge of rebuilding and revitalizing economic activities in the country, it is moreover notable that energy audits are embedded into today's rare opportunities of renewable energy finance for enterprises (listen to Executive's Renewable Energy Finance podcast with Nadine Tawk and Danny Maalouly of USAID).

Still, the awareness and practice of energy conservation among private householders remains underdeveloped. Furthermore, the attention given to reduction of electricity and energy wastage by public administrators appears to be amiss as one among many deficiencies in Lebanese institutions. Additionally, energy conservation in small, medium and tiny enterprises needs to be incentivized much more, as career environmental advocate and energy conservation practitioner Mario Ghoraieb describes in the following story of ongoing civil society-led and EU-supported efforts for pushing the agenda of energy preservation forward (For more on Mario Ghoraieb's views, also listen to our podcast on Lebanon's energy transition and its prospects of conservation, regulation and security).

AN EU-FUNDED INITIATIVE FOR LEBANON'S SMEs

BY MARIO GHORAÏEB



Reestart (Renewable Energy and Energy Efficiency for Sustainable Energy Transition and Reinforced Trust between SMEs and ESCOs) is a European Union funded project, with a budget of 2.5 million Euros over three years beginning in November of 2019. Instituto per la Cooperazione Universitaria (ICU) is the lead implementer alongside local and international partners including the Lebanese Solar Energy Society (LSES), the Italian National Agency for New Technologies, Energy, and Sustainable Development (ENEA); and the Federazione Nazionale delle Esco (FEDERESCO).

The project was designed starting from the identification of two main market criticalities. The demand side saw a significant need for renewable energy (RE) and greater energy efficiency (EE) technologies for small and medium-sized enterprises (SMEs) due to the lack of financial resources to invest in RE/EE and weak access to available SE finance. On the supply side, the project identified significant difficulties in making full use of alternative financing models to support RE/EE investments.

Challenges on the supply side were traced back to a lack of know-how within energy companies, and the absence of successful and replicable models at the national level. Reestart aimed to address both the demand and supply side to foster increased uptake and improved quality of the RE/EE services and solutions provided to the local market. It focused on reinforcing energy service companies (ESCOs), due to their potential to act as game changers in the national sustainable energy transition

IDENTIFYING DEFICIENCIES, CAPACITY BUILDING, AND PARTNERING FOR SUCCESS

Reestart's strategy focused on ESCOs' business development through empowerment and fostering of a supportive ecosystem and, mainly, trust-building through successful SMEs-ESCOs co-operation. Duly empowered, ESCOs can provide alternative financing models for RE/EE, and through successful partnership with SMEs within a supportive ecosystem, both ESCOs and SMEs can develop mutual trust. By fostering this trust, Reestart aimed to trigger a breakthrough that would lead to wider RE/EE adoption and ESCOs market growth. In turn, the cascading effects would include an increased RE share in national energy consumption, reduced overall electricity consumption and reliance on the

national electricity grid as well as private generators, and increased access to stable and secure green energy supply, thus contributing to Lebanese economic growth.

Specifically, participants in Reestart included all ESCOs listed under the Lebanese Center for Energy Conservation (LCEC) framework (their qualification process evaluates indicators such as the company's experience in the sector, financial revenues and services provided, and World Energy Council membership), 35 SMEs, and 20 energy and finance companies from both the public and private sector. The project endeavoured to pilot innovative technologies and business models, support access to available sustainable energy finance, and create a supportive institutional environment for ESCOs.

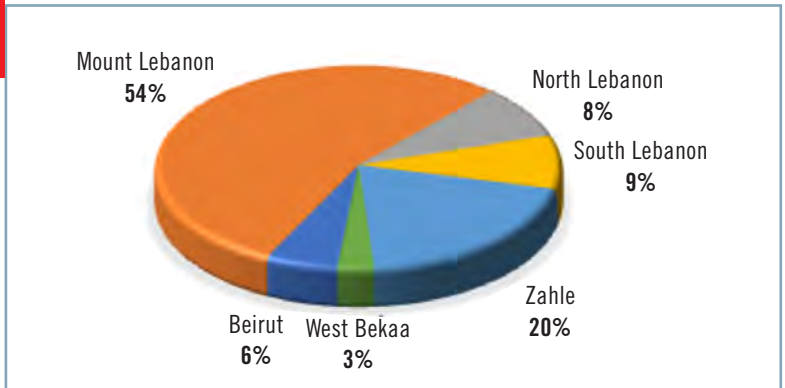
However, given the lack of know-how within most local energy companies concerning energy auditing, ESCO business models and proper methods of implementation, it was critical to develop these capacities and skills. Towards this end, ICU collaborated with the AEE (Association of Energy Engineers), to deliver a three-module training certification program to the selected companies on energy management (CEM), measurement and verification (CMVP) and performance contracting and financing (PCF). The program covered technical, financial and contractual aspects of ESCOs' business. Both qualified and aspiring ESCOs need to reinforce their overall capabilities. For ESCOs with LCEC qualification, this meant improving the quality and soundness of the services delivered and underlying contracts in order to consolidate their customer base and grow their business and financial capacity. On the other hand, aspiring ESCOs need to enhance their energy savings and performance contracting (ESPCs) and gain the technical skills needed to be acknowledged as qualified ESCOs, thus becoming more competitive on the local market. Once the energy companies received certification in the three above mentioned modules, they were ready to lead on the energy audits for the selected pilot implementation projects.

That said, it is of utmost importance to acknowledge that the partnership between the SME and ESCO is one of the fundamentals of the ESCO model. This is why ICU adopted the Decentralized Renewable Energy Power Generation (DREG) which matches and empowers the partnership between ESCOs and SMEs, enabling them to apply to the project jointly. The purpose of ESCOs nominating SMEs through this method is to build trust and foster a supportive ecosystem for successful cases of SMEs-ESCOs cooperation.

Another one of Reestart's objectives was to build a pilot of the ESCO business model through the ESCOs and SMEs involved in the project. This enabled the involved energy companies, newly considered as ESCOs, matched with their SMEs, to perform energy audits based on the developed Scope of Work (SOW) of the energy audit, the agreement signed between ICU and the energy company, and the notice signed by the SMEs (allowing ICU to perform and facilitate the audit) as well as the ESPC contract to be signed between the ESCO and the SME guaranteeing the savings.

■ Reestart's strategy focused on ESCO business development and trust-building through successful SME-ESCO partnership

SELECTED SMES BY DISTRICT



In total, 35 SMEs were selected from various sectors throughout Lebanon

The final selection of the six pilot projects was based on the grading of the SMEs and assessment of the ESCOs. The six pilot projects were financially supported by a donation of 110,000 Euros each. Each ESCO will secure the remaining amount from the participating SMEs through the return on investment of the implemented measures and based on the proposed savings.

In parallel with the selection of the six pilot projects, it was of crucial importance to develop the ESPC contract that framed the contractual relationship between the ESCO and the SME, a pillar for the ESCO business model. Therefore, we approached this matter in the following way:

Step 1: Designing a successful ESPC framework

The first step in designing a capacious ESPC framework is data collection and research. The project reviewed successful, longstanding ESPC programs in other countries, namely within the USA and UAE, in order to identify specific best practices that could be incorporated into the program's design. Additionally, the project collected data on the current status of the ESPC market in Lebanon.

Step 2: Strategic outreach plan

The second phase of the project included developing a strategic outreach plan in order to provide the necessary information and awareness to stakeholders (specifically facility owners and managers) involved in the ESPC process. The strategic outreach plan included a compiled document that describes the importance and process of ESPC (from audit to contract to implementation) as well as the responsibilities and duties of each involved party.

Step 3: ESPC Development and creation of standard templates and model documents

The development and creation of standardized templates and model documents was necessary to successfully guide the procurement and contracting process for involved stakeholders. Usually, there are two main approaches to solicit an ESCO: ESCO Pre- Qualification, and solicitation through a standard request for proposal. Since the project only considers ESCOs for a pool of a pre-qualified ESCOs, the ESCO solicitation with ESCO Pre-Qualification was used. This phase included the development of the eleven documents and templates.

In conclusion, the Reestart project, generously funded by the EU and spearheaded by the ICU and its partners, embodies a transformative endeavor to redefine Lebanon's energy landscape. Beyond meeting immediate energy needs, Reestart envisions a future where economic prosperity harmonizes with environmental sustainability. It not only represents a project for greater energy efficiency but a testament to international collaboration, strategic planning, and a commitment to fostering positive change. As Lebanon navigates the challenges of rebuilding and revitalizing economic activities, Reestart stands as a beacon, illuminating the path towards a more sustainable and energy-efficient future.

Mario Ghoraïeb is the energy and private sector unit manager at ICU

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Renewable Energy in Organic Farming

BY MARIO MASSOUD AND MARIE MURRAY



THE GRADUAL AND INEVITABLE LONG TERM SOLUTION

Organic farming, a fast-growing industry at the global level, has faced numerous challenges in Lebanon. According to a 2020 EU-led survey on organic ecosystems, these threats and weaknesses have been amplified by the country's economic crisis and include high production costs, lack of government subsidies, and the reduced purchasing power of Lebanese customers (a problem that has been exacerbated in the following two years with the worsening of the economic crisis). Faced with these challenges, among which a skyrocketing cost of energy was a particularly debilitating element, organic farmers and farming operators are turning to renewable energy (RE) solutions for both cost savings as well as to improve efficiency and reduce harmful environmental impact.

Biomass, an organic farming operator founded in 2007 which now has over 15 farms under management and works with over 50 farming partners, began a gradual switch to solar energy in February of this year. In addition to introducing water pumps powered by solar photovoltaics (PV) to three farms, they have also transitioned their packaging center in Batroun to solar power. For Biomass, whose name is only serendipitously—or perhaps prophetically—related to the term for fuel produced through organic matter, RE solutions have enabled the company to introduce greater efficiency and think about reduced consumption of resources in a new way. Despite high capital expenditures that make transition to renewable energy a long-term project, the advantages overwhelmingly make it a worthwhile, and even inevitable investment.



DIVIDED ENERGY

As a market participant that is active along the agricultural value chain, Biomass looks at energy use in two phases: the farming phase and the post-harvest phase. At the farming level, energy is used for the nursery, heating greenhouses, and for irrigation. Their focus centers primarily around how to optimize water consumption by irrigating less, improving rainwater collection, and keeping the soil rich, healthy, and moist, and through farming techniques such as strip farming, crop rotation, and companion planting to name a few. The introduction of water pumps connected to solar PV systems is a first step towards RE, but Biomass is also looking to bring in biofuel from composting matter and set up an agrovoltaic system where solar panels share land with agricultural products.

At the post-harvest level, energy is used for cooling, cleaning, storing, sorting, and packaging products. In the packing house in Batroun, fridges and machinery for packaging and labeling are now powered by solar panels which were installed gradually over six months and led to a trial-and-error approach. When energy consumption increased over the summer, more batteries were added to match the growing needs. At the time of this writing, Biomass is in a period of assessing whether more panels will be needed based on how well their fluctuating energy needs are met across production seasons.

Although Biomass farms and farming partners across Lebanon follow different location-based production timelines and harvest windows to benefit from various microclimates, the efficiency of Biomass' energy consumption is based on the season. During rainy months when solar energy is reduced, less energy is needed for irrigation. However, when the energy costs are annualized across the four seasons, the first year's experience with RE has manifested as reduction of operating costs through a 40 to 50 percent lowering of the monthly fuel bill, which in some months had run up as high as $7,000.

From its perspective as an environmentally and climate conscious actor in the agricultural value chain from soil and seed to packaging and delivery to market, Biomass' significant reduction in fuel consumption and fuel cost, however, is just one happy peak in a chain of benefits. The four big costs in the industry are land rents, energy and irrigation costs, labor, and costs of organic inputs. Out of these, installing solar pumping systems allows instant cost-saving, efficiency and environmental benefits towards energy and irrigation costs, which is evidenced by the fact that all Biomass' direct competitors in Lebanon have begun making the move to solar energy. The rationale is striking: once the initial investment can be managed—or made in gradual phases—solar energy allows for longer storage periods by avoiding steep diesel costs, and thus services can be offered for a longer period. Biomass' move to solar energy demonstrates—better than any theoretical paper on climate and environmental risks—that reliance on RE is incomparably more advantageous than usage of conventional fuel across the entire food value chain.

■ Biomass' significant reduction in fuel consumption, however, is just one happy peak in a chain of benefits

Although RE is more aligned with the organic and regenerative aims of Biomass' mission than carbon or diesel, the economic value is paramount for the company. To be both economically viable and regenerative, Biomass believes that the commercial must align with the financial which must align with the environmental aspects of the business model, and transitioning to RE is a step forward for all these objectives.

Mario Massoud is the CEO of Biomass and Marie Murray is an editor for Executive Magazine

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Oil wealth: one last chance for Lebanon

BY CHRISTINA ABI HAIDAR



FOLLOWING THE TRAIL OF EXPLORATION AND EXPLOITATION ATTEMPTS

The quest for oil exploration in Lebanon began in the early years of the French mandate when French High Commissioner Henry de Jouvenel issued a decree permitting exploration, extraction and investment in oil and mineral mines. The initial official Lebanese regulation for oil exploration and extraction, numbered 139 and dated June 23, 1936, marked a further pivotal step. But despite numerous pre-World War II attempts by successive governments to extract oil and gas, especially from the Lebanese onshore, they faced various challenges, leading to unsuccessful outcomes.

Amidst the turbulent years of superpower confrontation in the second half of the past century, the Lebanese Civil War, spanning from 1975 to 1990, further impeded exploration endeavors. Despite post-conflict efforts by subsequent governments in Beirut, progress remained limited into the first decade of the 21st century when Israel announced the discovery of the Leviathan field. The massive find, rumored to contain at least 16 trillion cubic feet, spurred on great Lebanese interest due to it being situated in the region between the maritime borders of Palestine and Cyprus. Subsequently, the Karish field was identified near the southern Lebanese maritime borders.

In 2010, the Lebanese Parliament ratified the Petroleum Resources Law in Lebanese waters, leading to the establishment of the Lebanese Petroleum Authority. The offshore oil decrees were finalized in 2011, and in 2012 the Lebanese Petroleum Authority (LPA) was established. Six members were appointed according to a sectarian quota, and they continue their mission at time of this writing despite the end of the Authority's tenure.

In 2013, the Ministry of Energy and Water (MoEW) announced the launch of the first licensing round in the Lebanese offshore waters, offering Blocks 4 and 9 for bidding. Numerous international companies applied for exploration rights. After a prolonged evaluation period, on December 14, 2017, the Lebanese government granted two exclusive licenses for oil exploration and production in the two blocks to a consortium comprising French multinational Total Energies, Rome-headquartered Eni S.p.A. and Siberia-based Novatek. Later on, Novatek, Russia's second largest natural gas producer, withdrew from the consortium due to US sanctions, and was recently replaced by Qatar Energy.

Unfortunately, exploration operations in Block No. 4 did not begin until 2020. However, the initial exploratory well did not yield any gas reserves in

commercial quantities, and the coalition did not pursue further exploratory attempts in Block No. 4. Exploration in Block No. 9 was delayed due to a dispute over maritime borders between Lebanon and Israel. In 2022, and after long and complex indirect negotiations, the US was able to reach a specific settlement to demarcate the maritime borders between the two countries, allowing exploration activities to begin.

Faced with this new and exciting fact, in August 2023 Total entered a contract with the American company "Transocean Barents," the world's second-largest offshore drilling contractor, to rent a rig for oil and gas exploration in Block 9. Unfortunately, the results from the exploration operations in this well were not promising.

These challenges were compounded by the outbreak of war in Gaza and a constitutional vacuum in Lebanon, marked by the failure to elect a new president and political disagreements over the current government's role. These factors resulted in a slowdown of exploration operations and negotiations with the consortium for the next stage.

Despite these setbacks, it's important to note that the initial exploration outcomes are not necessarily discouraging. Many countries have drilled numerous wells before discovering gas reservoirs. Some have drilled up to seven wells without success, only to find a reservoir in the eighth well. This pattern mirrors the experience in most current oil fields in the Eastern Mediterranean. For example, the largest gas field in the Mediterranean, which is the Zohr field located in Egypt's Shorouk concession, hugs the maritime border between Egypt and Cyprus. The exploitation rights of this field belonged to Shell for 15 years, during which the company drilled several wells but failed to find any gas quantities. They then sold the exploration rights to Eni in 2015, which in turn drilled a well at a depth of 5100 meters to find the largest gas reserve in the eastern Mediterranean, estimated at 850 billion cubic meters. This indicates that the discovery of gas is not always achieved through the drilling of the first well.

REQUIRED ROADMAP:

The delay in exploration operations is distressing for the Lebanese population, already grappling with severe economic and financial challenges. The promised oil wealth represents a potential lifeline for them amid the current crisis. However, this delay can be turned to advantage by formulating a clear strategy to harness the benefits of the oil wealth. Approval of a roadmap for laws, decrees and regulations is crucial. Thus, effective and transparent discussions involving stakeholders, experts, legal professionals and parliament members are necessary. These discussions should revolve around a fundamental question: what are the Lebanese aspirations regarding oil wealth?

The initial step in answering this question is recognizing that oil wealth is a natural resource that should serve and benefit the citizens of Lebanon and future generations. Categorizing oil revenues into emergency and unsustainable funds is imperative. A portion of these funds can be allocated to developing infrastructure and essential public facilities, fostering industrial growth and other vital services. Simultaneously, there's a need to realize that these revenues cannot solely sustain the state's financial needs, prompting the creation of an independent internal Lebanese economy.

These discussions should revolve around a fundamental question: what are the Lebanese aspirations regarding oil wealth?

Achieving this requires coupling exploration and extraction operations with the establishment of a transparent, honest and highly competent government administration. This need extends beyond the oil sector to encompass all government authorities, an aspect sadly lacking in Lebanon. Many political forces view the promised wealth as their entitlement, potentially leading to activities that consolidate their control over Lebanese political life. Relying on such thinking risks creating another failed and bankrupt oil state.

Addressing the fundamental question outlined above necessitates outlining practical steps for the strategy. This involves developing both new and existing industries, leveraging the explored gas, particularly in electricity generation. Given that most electricity generation plants in Lebanon can utilize natural gas, establishing a coastal pipeline to supply major plants (Tyr, Al-Zahrani, Jiyyeh, Zouk Mikael and Deir Ammar) is vital. This not only reduces environmental pollution but also lessens the burden on the Lebanese treasury for oil imports. Additionally, it extends the lifespan of electrical production generators and ensures a diversified source of fuel. This is especially pertinent since the public utility, Electricite du Liban (EDL), which has the exclusive rights to generate electricity, currently relies on one sole source of oil—heavy fuel oil—for electricity generation. Dependence on gas will also open the door for other clean resources (such as hydro, solar and wind) to be involved in the production process.

To safeguard Lebanon's self-sufficiency in explored gas before any exportation, the Parliament should enact legislation, following the example of numerous oil and gas-producing countries. This


Zahrani oil reserve

■ Lebanon must expedite the demarcation of its maritime borders with Cyprus to the west and with Syria to the north

comprehensive approach is crucial for steering Lebanon away from the pitfalls of becoming a failed and financially unstable oil state.

Hydrocarbon extraction is a nascent industry in Lebanon, exerting a nuanced impact on the environment across various dimensions. Hence, Lebanon must prioritize environmental preservation and shield itself from any activities that may alter its ecological and touristic appeal. This involves enforcing global standards on exploration, transportation, and storage companies, with stringent monitoring and accountability measures in case of errors.

BORDER DEMARCATION, REGULATION AND LEGISLATIVE BODIES

Lebanon must expedite the demarcation of its maritime borders with Cyprus to the west and with Syria to the north. This matter should not be underestimated as it ensures stability, which encourages reputable companies to participate in exploration operations in the blocks located in the two countries' adjacent territorial waters.

The enactment of legislation governing oil and gas exploration on Lebanese territory, particularly onshore operations due to their cost-effectiveness, should be promptly completed. This process must carefully consider environmental conditions, safeguarding groundwater, riverbeds, antiquities and ensuring fair and prompt compensation for necessary expropriations.

Establishing a storing and transportation national oil and gas company to store petroleum extraction and handle transportation activities is imperative. This entity should replace the oil installation facilities in Tripoli and Zahrani, defining its legal, administrative, and financial structure clearly and effectively. Its core responsibilities should extend to the storage, transportation and export of gas, considering Lebanon's significant oil reserves in Tripoli and Al-Zahrani, along with the need for the rehabilitation and development of existing oil refineries.

Additionally, a national oil company, modeled after those in other oil-rich countries, should be formed. Adhering to the principles of good governance, this company should collaborate with major international firms in operational activities. The primary objective behind establishing this national oil company is to ensure Lebanon's security and energy independence, aligning with an economic policy that fosters collaboration with neighboring countries across various sectors.

Crucially, the establishment of a sovereign oil and gas wealth fund is required, dedicated to housing oil and gas revenues along with profits from its investment operations. Recognizing that oil revenues differ from conventional taxes, the fund should serve the interests of future generations. A portion of these funds can be utilized for the advancement of human development in Lebanon, supporting research centers, educational institutions, infrastructure, etc. The management of this fund must be independent, free of narrow political and sectarian influences and interference.

Before initiating these steps, the government, following the election of a new president, must promptly appoint experienced and transparent members to the LPA.

Lebanon's leaders, study centers, and advocacy groups should capitalize on this opportunity to endorse and compel Parliament members and the anticipated government to adopt this comprehensive strategy. Clear, transparent regulatory provisions should be established to delineate the processes of extracting, transporting and benefiting from oil and gas, ensuring that Lebanon's anticipated oil wealth becomes a boon rather than a curse. Drawing lessons from past experiences, Lebanon must seize this opportunity to harness its natural resources effectively, preventing any irreversible losses.

Christina Abi Haidar is a lawyer and legal expert on energy. Listen to more of her views on energy security and regulation in Executive's podcast.

Consuming energy

PATTERNS AND STRATEGIES IN THE ARAB WORLD

Arab countries are witnessing a fundamental recalibration of their different roles in the global game of energy. The world's accelerated awareness of energy security priorities and still growing climate risks necessitates a, however reluctant, global rethinking of energy policies and politics, which for the past century had cast exploiters and consumers of fossil energy sources into corresponding positions of innate strengths and urgent needs. No longer is the Arab world easily compartmentalized into rich or richer oil exporters with no other concern than the optimization of hydrocarbon production and under-affluent oil importers whose expanding population numbers are their blessing and bane.

TABLE OF NDC PER ARAB COUNTRY

Country	*Most re-cent NDC version*	*Target year at time of writing*	*Top nationally determined contribution/s (NDC) to UN Climate targets*
Morocco	2021	2030	52% of electrical power generation from Renewable Energy (RE); 45.5% emission reduction under global objective and 18.3% under unconditional objective (reference year 2010)
Algeria	2016	2030	27 % of electrical power generation from RE; 9 % reduction in energy consumption
Tunisia	2021	2030	45% decrease in its carbon intensity compared to 2010
Libya	none	none	n.a.
Egypt	2023	2030	42 % of electricity generation from RE; 37% reduction in emission (reference year 2015)
Palestine	2021	2040	20-33% electricity generation from RE, primarily from solar PV; 26.6% emissions reduction (under "Independence scenario")
Jordan	2021	2030	35% or more RE share in electricity production; 31% emissions mitigation target (reference year 2012)
Iraq	2021		No stated commitment as to the share of RE in total electricity production; a 1 – 2 % emissions reduction target under an unconditional scenario is juxtaposed with a 15 % target under a conditional (i.e. with international financial and technical support) scenario.
Syria	2018	2030	10% Share of RE in power production and other targets contingent on "real support by international donors" to existing initiatives and new implement projects
Lebanon	2021	2030	30 % RE share in electricity production under conditional scenario (18% unconditionally); emissions reduction target of 20 % under unconditional scenario, 31 % under conditional scenario
Cyprus	2023	2030	55 % goal for reduction in emissions (under EU Climate law)

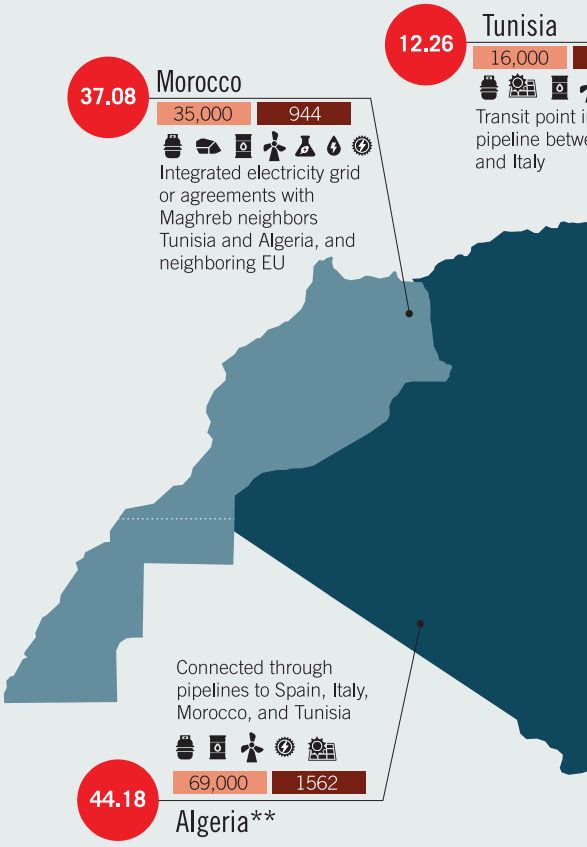
Source: United Nations Framework Convention on Climate Change

ENERGY SECURITY
INFOGRAPHIC

In the changing world energy order, climate risk mitigation, climate change adaptation, and renewables are trumps of a more sustainable future under the perspective of energy security, while perceptions of risks affiliated with energy sources such as nuclear and hydrocarbons have flipped from wild enthusiasm to rejection. In the context of population growth, annual increases in electricity consumption of 2 percent on global level, and long-unabated rises in damaging carbon emissions (they doubled for example in the three decades since climate alarms were rung at the Earth Summit in Rio de Janeiro back in 1992), energy security is the aspiration to have affordable, diversified, sustainable, and adequate/reliable access to progressively cleaner energy. Over this period, electricity production and consumption data of Arab countries show an increase from 309 terawatt hours (TWH, or 309 billion kilowatt hours) in 1993 to some 1389 TWH in 2022. In terms of individual consumption, the numbers in the region show immense variance between countries, to the point that the "average" Lebanese supposedly consumes slighty more than the global average in electricity and thus uses as much of this resource in 10 days as is afforded to the average Yemeni in a year… not to speak of the discrepancy between top Arab consumers of electricity and the global average or bottom, where Yemen is situated. In the global context of climate risk alertness, Arab countries are now classified by most indices on the matter as highly vulnerable and sufferers of energy insecurity, with Lebanon and its Arab neighbors among the most vulnerable. Bets are on for diversification, renewability, and reduction/conservation of energy, not for extracting the most in temporal profits at any cost.

The new rules and strategies of the energy game appear to favor and reward diversification and collaboration, win-win strategies of mutually profitable exchange and inter-territorial sharing of energy that is produced from renewable resources. At the same time, the long track record of ever more intense production and relentlessly increasing consumption shows that the status quo of dependency on fossil sources and mercantile organization, with international mechanisms of energy finance and major roles for producer conglomerates such as OPEC, are not fated to vanish from economic and political visibility like smoke from an extinguished wood fire.

ENERGY TRANSITION FOR LEBANON

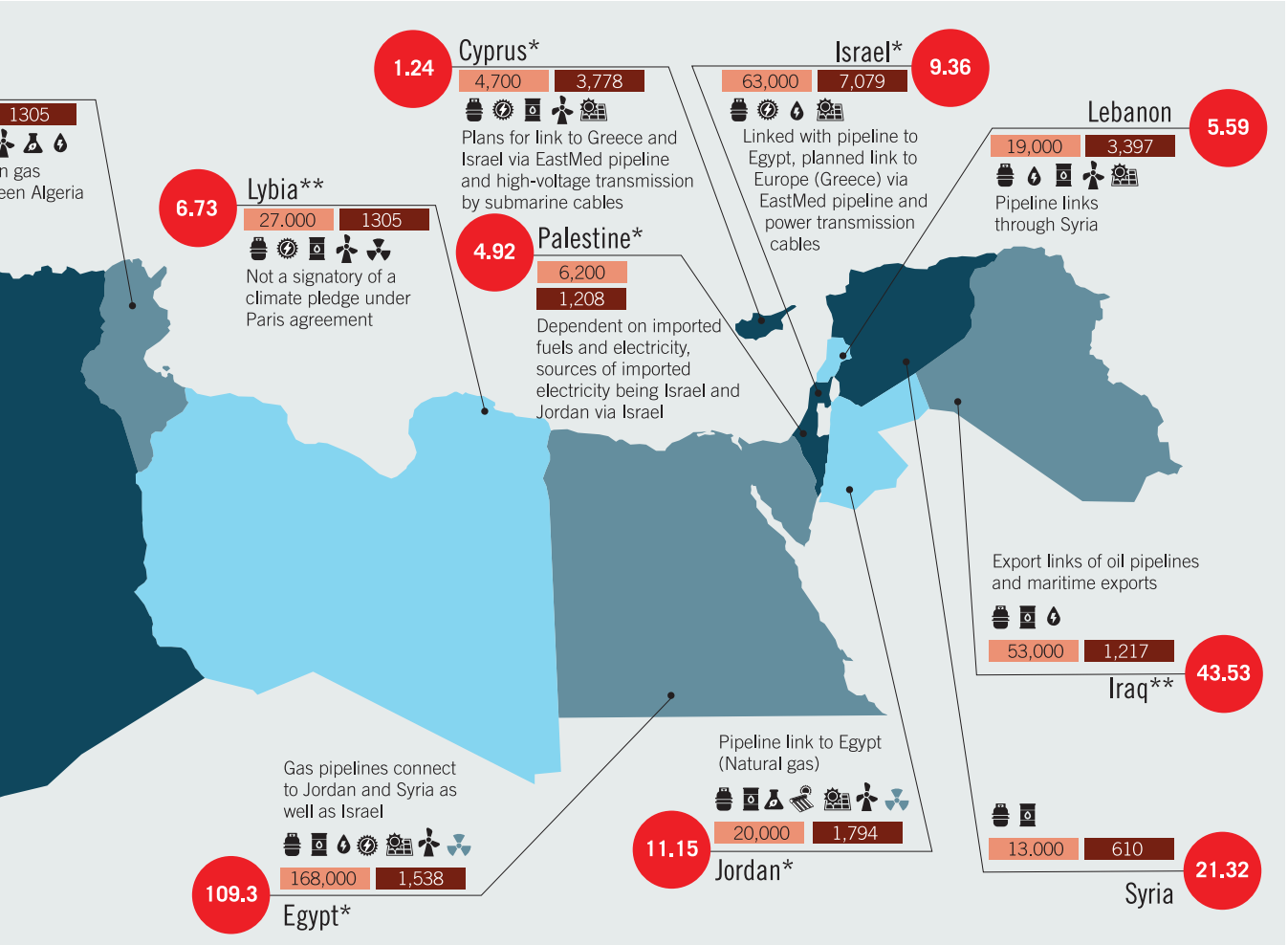


Baseline data and sources of energy that are produce

Gas
Wind
Coal
Hydropower

*Denotes membership in East Med Gas Forum (other member
**Denotes OPEC member country

Sources: United States Energy Information Agen



d for exports, used domestically, under development, or under consideration

- Oil
- Biomass Potential
- Solar
- Solar Photovoltaic
- Solar Water Heating
- Nuclear
- Nuclear Project

- Population in million persons according to UN data for 2021
- Electricity consumption in country (gigawatt hours in 2021)
- Electricity consumption per capita (kilowatt hours in 2021)

rs are France, Italy, and Greece)

cy, World Bank Population Data, United Nations Framework Convention on Climate Change, Wikipedia

■ The new rules of the energy game appear to favor and reward diversification and collaboration

Strategizing Lebanon's energy security

BY THOMAS SCHELLEN



PAUL SALEM, DIRECTOR OF THE MIDDLE EAST INSTITUTE

To understand how vital energy issues are impacted by and perceived from a broader perspective of political interests and policy priorities located far from Beirut, Executive conversed with Paul Salem, renowned Lebanese academic and director of the Middle East Institute in Washington D.C.

How does Lebanon appear on the various maps of interest that one can find "inside the Beltway," meaning the circles of power in the capital of the United States of America? Is everything seen through the political lens or are there still human connections to Lebanon?

Everything has been overshadowed by the war in Gaza, so that not much attention [is given] to Lebanon. When you take a step back and look at the US and policies and relations to Lebanon, there are several things to note. I would mention here firstly that Lebanon and the Lebanese are part of modern American history for over 100 years and play a role in the American conscience, where they are generally viewed positively. Secondly, some Americans who matter have been to Lebanon at different points of recent years. Those who have gone, whether they are journalists, politicians, or business people, come back with a positive impression.

On a more political-strategic side of things, [the question is] how the US policy community looks at Lebanon. There again are different layers to this. On one layer, the US looks at Lebanon as a place to contain, counterbalance and push back on Iran, and Hezbollah. Part of the [American interest] in Lebanon is to try and make sure that Iran and Hezbollah do not completely take over the country. Secondly, there is a concern that [Lebanon] does not completely fall apart and becomes another collapsed state in the Middle East that becomes a headache of exporting refugees and importing terrorists. [Lebanon] is a problem but so far one that is manageable and contained. In a kind of a negative concern, [the Americans] don't want it to become more of a problem. Thirdly, the strategic location of Lebanon is one of being next door to the Russians and ISIS in Syria. It is a place on the Eastern Mediterranean where [the US] can keep an eye on Eastern Mediterranean issues. It is an anti-Russian, anti-terrorism, Eastern Mediterranean kind of strategic location.

More recently, after the Russian invasion of Ukraine, the energy and offshore gas issue has become strategic for both the US and Europe. After the Russian war on Ukraine, gas has become a very strategic issue for NATO and the Western Alliance and so the US sent Amos Hochstein many times to broker a deal with Israel over the gas fields [that lie offshore their territories].

On the other hand, there are [some on the rightwing of the US political field] who look at Lebanon simply as Hezbollah country. Those people, who are still a minority in congress, often say and [try to push decisions] that [the US] shouldn't fund Lebanon and its army. [They say that] it is all controlled by Hezbollah. The US should not be there, should not be spending any money or helping anybody there because this all benefits Hezbollah, [they argue]. This is a voice in congress, but it is not a dominant voice.

Given the US administration's perspective of regarding Lebanon, as you describe it, as strategic location in the Middle East and bulwark against terror, how does the issue of energy figure? Does energy in the Eastern Mediterranean actually play a role in American thinking?

Energy has become one of the elements that

the US is interested in and concerned about, but I would not say that the [strands of] thinking have become perfectly integrated to first of all allow Israel to extract its energy but also to allow Lebanon to extract so that eastern Mediterranean gas can become part of the energy imports of Western Europe. This, yes, is an overall US strategy, but is it perfectly integrated? If you look at Washington, there is one administration but there are different power centers and relationships. For example, the Department of Defense has strong and deep, positive and personal relationships with the Lebanese Army. The Pentagon is always a big defender of aid to Lebanon and the Lebanese army when this issue is raised in Congress. The Department of Energy thinks all the time about energy. The Department of the Treasury thinks about sanctions, money laundering and terrorist financing. There are different relationships in this complex web of relationships.

E Prior to looking for the Eastern Mediterranean maritime border demarcation, it seemed to me that Lebanese thinking on oil and offshore exploration was insular, not thinking much of the regional interactions and transnational aspects of the oil and gas potentials. Do you see a shift in the Lebanese approaches before 2020 and those between 2020 and 2022?

I would say that the main obstacle in Lebanon, as for many things in the country, is the fight among different political factions over who gets to do what, and who gets which prize. Lebanon could have begun exploring [offshore gas reserves] years ago, regardless of whether it wanted to use gas internally or externally. The political system is just too divided and dysfunctional.

> More recently, after the Russian invasion of Ukraine, the energy and offshore gas issue has become a very strategic issue for NATO and the Western Alliance

E The maritime agreement was signed, and the blocks were opened for exploration, but do you that the Lebanese readiness for actually capitalizing on the demarcation agreement was present?

There were two dynamics as to why Lebanon

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did finally make a deal. On one side there was American interest that came [about] after the Russian invasion of Ukraine. The US had been mediating before, but I don't think mediating with the same urgency and vigor. On the Lebanese side, the final round of negotiations happened after the Lebanese economy collapsed and the entire population became destitute, and Hezbollah and its allies were carrying the blame for the economic collapse. This meant that Hezbollah would be more eager to make a deal that would provide economic promise so that it could say, 'look, we are working for you, working for you by making a deal that opens gas'. Also, on the part of President [Michael] Aoun and Gebran Bassil, the President had an interest in having some positive news before the end of his term and Bassil, I think, is still trying to find a way out of sanctions.

■ Lebanon's problem is sovereignty and governance. It is not the absence of energy options.

E The crisis has created a huge impetus for renewables in Lebanon at a time when the global focus is on climate risk mitigation, but at the same time it seems clear that energy security cannot be reached either globally or locally without accessing conventional sources. Do you see the exploration of offshore gas potentials as very important for future energy security in Lebanon?

You are talking about energy security in a country which does not even have current energy. Usually, you talk about energy security in a country when you [assess] your energy [sufficiency] and look down the road [asking] 'where could I lose my energy and what is my security?' It is obvious that Lebanon has very, very little energy, and this is one of the major reasons that is keeping the economy at a standstill. We don't have energy. Offshore natural gas, which will take many years to come online, would be an obvious way to get onto the energy grid with significantly cleaner hydrocarbon energy production and cleaner fuel than oil. Lebanon with its almost non-existent resources and non-existent capacity to plan or implement [economic projects] is in a very poor situation with offshore gas as the only thing that is out there. When you think longer term and regional energy transition, you first of all have to think regionally. Ideally, this would be achieved on a region-wide level. Electricity grids would be integrated throughout the Middle East, as some countries have a lot of solar, some countries have hydro, some will have wind, others will have cleaner hydrocarbons. The situation that we want to get to by 2035-40 would be an integrated Middle Eastern energy network, but with the way Lebanon is today and how Syria is today, you can't really imagine that.

E In your opinion, can regional energy security be stabilized after the conflict in Palestine ends?

There has been a temporary interruption where the Tamar field stopped production in a period of heightened insecurity as Hezbollah and Israel starting trading military blows. But my broader sense is that this [situation], even if it looks to go on for more than a few months, does not affect the overall picture. The overall picture is being affected by the fact that the Eastern Mediterranean has not yet figured out the most cost-efficient and sustainable way for getting [its] gas to Western Europe in particular. There has been talk of an underwater pipeline for gas, which has not happened, and talk for an electric cable to transport the energy. It is also not yet resolved how Eastern Mediterranean [gas] forum countries deal with Turkey, which would open options [for transporting Eastern Mediterranean energy] through Turkey.

E Do you have any prophetess or prophet at the Middle East Institute who can tell us if we will ever have energy security in Lebanon?

Lebanon's problem is sovereignty and governance. It is not the absence of energy options. So, I can easily imagine many scenarios where Lebanon definitely obtains first of all energy sufficiency, and, with proper arrangements, energy security. A lot of that in my view would hinge on the offshore gas and using that to feed the stock inside the country and use some of it to develop the clean fuels that it needs to supplement [fuel imports] and a share of energy. Lebanon is a very small country. You are not talking about energy security for China but for a country that is the size of a municipality in some other countries. It is not a big challenge, but our governance is so miserable that we are not even able to pick up the trash, let alone produce the right energy.

BUSINESS ESSENTIALS

THE BULLETIN

Global Village, the UAE and wider region's leading multicultural family destination for culture, shopping, and entertainment, in partnership with Geely AGMC announced one of many surprises to take place in Season 28.

Funded by the Government of Canada through the Lebanon Recovery Fund, and as part of the Joint United Nations Productive Sectors Development Programme (PSDP), **the Food and Agriculture Organization (FAO)** concluded a project that positively impacted over 406 male and female farmers in North Lebanon and Akkar. During the project's culmination, FAO facilitated the gathering of farmers, presenting 65 of them with Integrated Crop Management Certificates and four farmers with Organic Agriculture Certificates tailored for fruits and vegetable value chains.

Roche Pharmaceuticals in Lebanon launched the "Real World Data/Evidence" (RWD/E) Roche Award project, an initiative that brings together multiple Lebanese academic institutions in a scientific and academic competition to present the most outstanding proposal in the realm of real-world data and evidence.

Arthur D. Little (ADL), a management consulting firm, published the latest issue of AMPLIFY, an ADL-edited journal that brings academic experts and business leaders together to advance thinking in critical areas of business and technology. The Journey to Decarbonization offers valuable guidance for businesses, providing a roadmap for achieving sustainable practices and addressing the pressing issue of reducing carbon emissions.

Students in the **American University of Sharjah (AUS) College of Engineering (CEN)** will have new opportunities in IT-related fields thanks to a Memorandum of Agreement (MOA) the university signed with Beta Information Technology.

The **2023 Nissan Ariya,** Nissan's most advanced vehicle ever, was awarded the Insurance Institute for Highway Safety's (IIHS) 2023 TOP SAFETY PICK+ designation for vehicles built after March 2023 – the agency's highest rating. IIHS awarded the rating based on strong performance in crash tests, headlight evaluations and the capability of its crash-prevention technologies.

Visa Inc., a world leader in digital payments and TECH5, an innovator in the field of biometrics and digital identity management, signed a strategic collaboration agreement focusing on the development and enhancement of digital government ecosystems on a global scale.

Dubai Parks™ and Resorts, the Middle East's largest theme park destination, invited all UAE residents and visitors to welcome the year 2024 in style with a spectacular laser show followed by exciting family-friendly fireworks in an outstanding double New Year celebration.

Atlantis, **The Palm,** the iconic luxury resort, announced its highly anticipated New Year Sale, inviting guests to revel in unparalleled opulence with remarkable discounts on accommodations. From the splendor of the rooms and suites to the myriad of entertainment options, Atlantis offers an extraordinary opportunity to create unforgettable memories.

Kia announced it will redefine the term PBV as 'Platform Beyond Vehicle' and officially launch its global PBV business at CES 2024 in Las Vegas, USA. The brand is set to introduce its future PBV product lineup and business vision, along with physically showcasing several PBV concept models. Kia PBV is a total mobility solution combining fit-for-purpose EVs with advanced software solutions that will open the door to new businesses and lifestyles.

Royal Philips, a global leader in health technology, announced the results of its Future Health Index (FHI) 2023 Saudi Arabia report: Taking Healthcare Everywhere. Now in its eighth year, the Future Health Index is based on proprietary research across 14 countries, including Saudi Arabia, making it the largest global survey of its kind to analyze the current and future priorities of healthcare leaders worldwide.

The Parliament of Lebanon passed a law that establishes a comprehensive pension system for private sector workers and fundamentally reshapes the governance of the National Social Security Fund (NSSF).

The Public Relations and Communications Association in the Middle East and North Africa announced strategy and communications advisory firm TrailRunner International, as its latest corporate member.

Energy, a world-leading innovator in battery development software, announced a technology licensing agreement with the **University of Portsmouth and the University of Southampton**, to advance battery modeling and accelerate electrification across the automotive and energy storage industry.

The impact of Lebanon's unrelenting, overlapping crises continues to worsen, increasingly robbing children of their education and forcing many into child labor, as parents struggle with ever-diminishing resources. With data collected in November 2023, **UNICEF analysis** reveals further

deterioration in almost every aspect of children's lives, as the four-year-long crisis shows no sign of abating. The emotional burden is particularly heavy in conflict-affected southern Lebanon and among Palestinian children.

Abdulla Al Masaood & Sons Automotive (AMSA), a prominent group of companies in the UAE, announced the appointment of Memac Ogilvy & Mather Lebanon as its new digital communications partner.

The Minister of Public Health, Dr. Firass Al-Abiad, accompanied by **WHO representative in Lebanon Dr. Abdinasir Abubakar** and **the German Ambassador to Lebanon, Mr. Kurt Georg Stoeckl-Stillfried,** visited the Ministry of Public Health's Central Drug Warehouse for the handing over of trauma and emergency surgical kits procured through WHO under the readiness and response plan in the face of the ongoing border conflict.

The **Kia EV9** was shortlisted for the final round of the 2024 Car of the Year (COTY) in Europe award. The all-electric SUV was provisionally listed among 28 new models launched this year and has now been selected by the 59 COTY jurors from 22 countries for the seven-strong shortlist. The overall COTY winner will be announced on Monday, February 26th at the Geneva International Motor Show.

In a special episode of the **Heya show,** a platform dedicated to showcasing the achievements of Arab women in various fields, former Minister Raya Al-Hassan will be featured in the next episode scheduled to air on December 11, 2023, on MTV Lebanon. The program, which narrates women's success stories and highlights the details of their journey from the beginning, hosts prominent figures who share their experiences, inspiring women globally.

TotalEnergies in Lebanon, in collaboration with **Cedars for Care NGO**, planted 200 Leyland trees covering 72 square meters of the National Park of Beirut, Horsh Beirut. This initiative underscores TotalEnergies' commitment to both society and the environment, as the company is participating in creating green spaces accessible to all Beirut citizens at the heart of the city.

The American University of Beirut launched the **Good Governance and Citizenship Observatory (GGCO)** in an event that took place on December 5, 2023 at the Asfari Institute for Civil Society and Citizenship at AUB. This pivotal gathering marked the launch of an initiative dedicated to fostering responsible governance and active citizenship in Lebanon and the region.

To make the most of the opportunities created by having MENA as the site of two successive COP meetings, global technology company **SAP SE (NYSE: SAP) and ChangemakerXchange** have been bringing together the region's leading young changemakers to build their individual and organizational capacity and collaborate towards a more resilient region in the face of the growing climate crisis.

Rebirth Beirut continues its activity and work in the capital and is successfully completing a new phase of projects, this time in cooperation with ABC, as part of the "Let's Light Up Our Community" initiative in partnership with **Medco** to light up the city. This project, launched in May 2022, continues with great success and aims to breathe new life into the streets of Beirut, this time by illuminating the surrounding streets of ABC in Achrafieh and Verdun. For the occasion, a ceremony was held at ABC Achrafieh in the presence of the Governor of Beirut Judge Marwan Abboud, the President and Vice President of Beirut Municipality, along with social personalities and media representatives, as well as ABC customers.

LAU Medical Center- Rizk Hospital and LAU Medical Center- Saint John's Hospital announced their pioneering efforts to launch an awareness and vaccination program against the human papillomavirus (HPV), which aims to eliminate cancers associated with this virus, through a press conference that took place in LAUMC- Rizk Hospital. With an unwavering commitment to public health, the Lebanese American University Medical Centers aim to raise awareness about HPV, educate about the risks associated with it, and launch this vaccination campaign as a preventive measure.

In a ceremony held at **Beit Kanz**, a prominent architectural and cultural hub in Beirut, 100 cedar trees were allocated in a draw to 100 Lebanese individuals living abroad and not having a father of Lebanese nationality. The event was attended by the Ambassador of Argentina to Lebanon, journalists, editors, NGOs, previous edition winners, and Banque BEMO family.

Following a landmark partnership deal between S**pinneys Dubai** and The **Al-Hokair Group** to establish the Spinneys brand in Saudi Arabia, a second Spinneys store is set to open in the country's prime business and lifestyle destination, the King Abdullah Financial District (KAFD), Riyadh.

Qatar University (QU)'s College of Arts and Sciences, and the **American University of Beirut (AUB)'**s Faculty of Agricultural and Food Sciences have inked a Memorandum of Understanding (MoU). This strategic partnership seeks to promote academic and research collaboration in the areas of food security and sustainable food production systems, aligning with global imperatives for environmentally conscious practices in food production and distribution.

The American University of Beirut Medical Center (AUBMC) has successfully performed a highly rare replantation surgery in a groundbreaking medical achievement in the field of microsurgery in the region. In a remarkable display of skill and expertise, this extraordinary and challenging feat highlights the unparalleled capabilities of AUBMC's medical professionals and their commitment to pushing the boundaries of medical science and the rigidity of the Lebanese healthcare sector despite its surrounding challenges.

The British Council's International English Language Testing System (IELTS) stands as a globally recognized benchmark for assessing proficiency in the English language. It is a pivotal tool for individuals seeking to demonstrate their language abilities for various purposes, such as academic pursuits, immigration, or professional advancement.



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