



## **TOWARDS SUSTAINABLE GREEN TRANSITION IN LEBANON AND SYRIA**

Identifying Policy Gaps and Spotting Opportunities  
to Design Sustainable Policies

*Mohammad Makki, Jeanne Mawad and Neli Lalkovska*



**FEMISE CONFERENCE PAPER**

**SHIFTING PARADIGMS:**

**Opportunities for a Deeper EU-Mediterranean Integration in a Changing World**

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**IDENTIFYING POLICY GAPS AND SPOTTING OPPORTUNITIES TO DESIGN SUSTAINABLE POLICIES**

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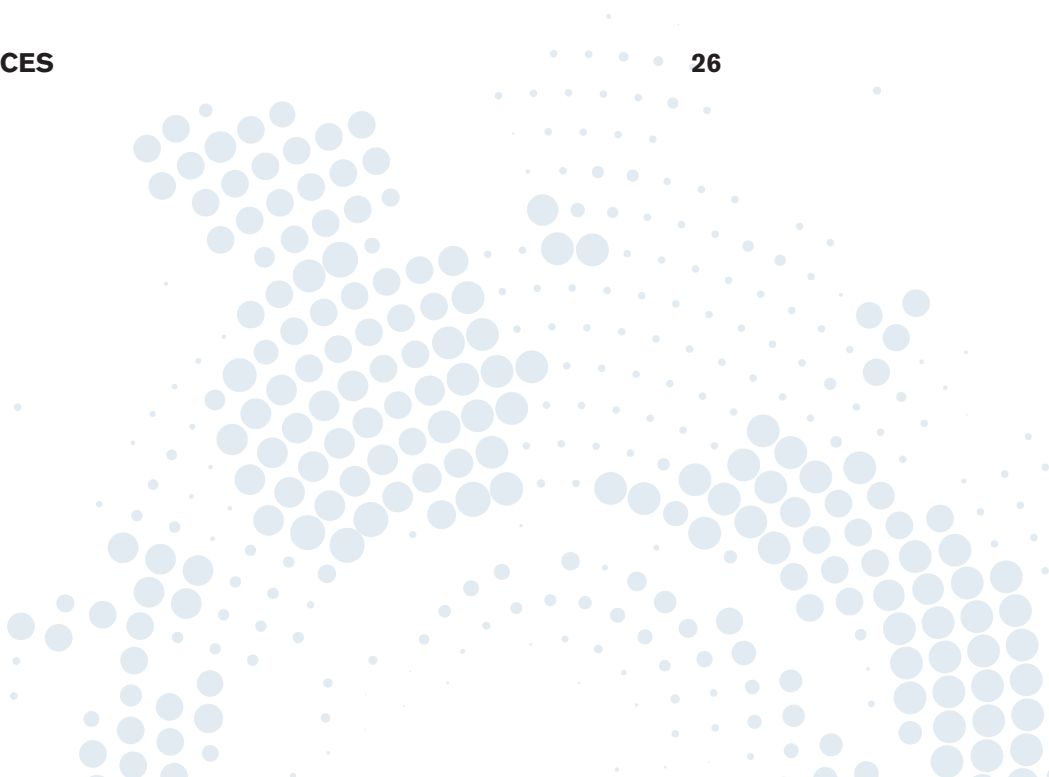
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## CONTENTS

<b>ABSTRACT</b>	<b>4</b>
<b>INTRODUCTION</b>	<b>6</b>
<b>LITERATURE REVIEW</b>	<b>7</b>
Lebanon and Syria; Context and Facts	7
Energy Sector: Pledges and Policies	10
Entrepreneurial Challenges in the Green Energy Sector	12
<b>RESEARCH METHODOLOGY</b>	<b>17</b>
<b>KIIS AND FOCUS GROUP</b>	<b>18</b>
Interview with Marc Ayoub	18
Interview with Samer Aswad	19
Focus Group featuring Nancy Saliba, Linda Achkouty Moawad, Ghaith Yaseen, and Mohammad Nour Al-Adlbi	20
<b>CONCLUSIONS AND RECOMMENDATIONS</b>	<b>24</b>
<b>REFERENCES</b>	<b>26</b>



## ABSTRACT

This policy paper casts a spotlight on the struggling ecosystems that stymie entrepreneurial efforts within the green transition sector, with a keen focus on Southern Mediterranean nations like Lebanon and Syria. It unearths critical policy gaps and highlights the multifaceted challenges impeding progress—ranging from inadequate government intervention and outdated regulatory frameworks to insufficient infrastructure, weak support systems due to internal conflicts caused by the political conflict and war in Syria, and a lack of sustainable financing and public awareness. Recognizing entrepreneurship as a pivotal force for driving change, the study emphasizes the need for long-term investment and expert guidance to fuel transformation. Based on information gathered through key informant interviews and Focus groups with experts in the field of green energy, the policy paper advocates for strategic engagement with donors, international NGOs, academic institutions, innovation hubs, and financial entities, proposing a blend of sustainable funding mechanisms and collaborative efforts. It also underscores the crucial role of universities and innovation centers in fostering awareness, developing relevant curricula, and shaping regulatory frameworks to bolster entrepreneurial ecosystems.

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### **Vers une transition verte durable au Liban et en Syrie**

Identifier les lacunes politiques et repérer les opportunités pour élaborer des politiques durables

### **RÉSUMÉ**

Cette étude met en lumière les écosystèmes en difficulté qui entravent les efforts des entreprises dans le secteur de la transition verte, en mettant l'accent sur les pays du sud de la Méditerranée, tels que le Liban et la Syrie. Elle met en évidence des lacunes politiques critiques et souligne les défis multiples qui entravent le progrès - allant d'une intervention gouvernementale inadéquate et de cadres réglementaires obsolètes à des infrastructures insuffisantes, des systèmes de soutien faibles en raison de conflits internes causés par le conflit politique et la guerre en Syrie, et un manque de financement durable et de sensibilisation du public. Reconnaissant que l'entrepreneuriat est un facteur essentiel de changement, l'étude souligne la nécessité d'investissements à long terme et de conseils d'experts pour alimenter la transformation. Sur la base des informations recueillies lors d'entretiens et de groupes de discussion avec des experts dans le domaine de l'énergie verte, ce papier préconise un engagement stratégique avec les bailleurs de fonds, les ONG internationales, les institutions académiques, les centres d'innovation et les entités financières, en proposant un ensemble de mécanismes de financement durable et d'efforts de collaboration. Il souligne également le rôle crucial des universités et des centres d'innovation dans la sensibilisation, le développement de programmes d'études pertinents et l'élaboration de cadres réglementaires pour soutenir les écosystèmes entrepreneuriaux.

## نحو تحوّل أخضر مستدام في لبنان وسوريا

تحديد الفجوات في السياسات ورصد الفرص لصياغة سياسات مستدامة

### ملخص

يسلط هذا البحث الضوء على النظم البيئية المتعثرة التي تعيق جهود ريادة الأعمال في قطاع التحول الأخضر، مع التركيز الشديد على دول جنوب المتوسط مثل لبنان وسوريا. ويكشف عن الثغرات الحرجة في السياسات ويسلط الضوء على التحديات المتعددة الأوجه التي تعيق التقدم - بدءاً من التدخل الحكومي غير الكافي والأطر التنظيمية القديمة إلى البنية التحتية غير الكافية، وضعف أنظمة الدعم بسبب النزاعات الداخلية الناجمة عن الصراع السياسي والحرب في سوريا، والافتقار إلى التمويل المستدام والوعي العام. مع الإقرار بريادة الأعمال كقوة محورية لدفع عجلة التغيير، تؤكد الدراسة على الحاجة إلى استثمار طويل الأجل وتوجيهات الخبراء لتعزيز التحول. واستناداً إلى المعلومات التي تم جمعها من خلال مقابلات مع خبراء في مجال الطاقة الخضراء، يدعو البحث إلى المشاركة الاستراتيجية مع الجهات المانحة والمنظمات غير الحكومية الدولية والمؤسسات الأكاديمية ومراكز الابتكار والمؤسسات المالية، ويقترح مزيجاً من آليات التمويل المستدام والجهود التعاونية. كما تشدد الورقة على الدور الحاسم للجامعات ومراكز الابتكار في تعزيز الوعي وتطوير المناهج الدراسية ذات الصلة وتشكيل الأطر التنظيمية لتعزيز النظم البيئية الريادية.

## INTRODUCTION

The Mediterranean region faces a formidable challenge from climate change. The escalating environmental crises, fueled by shifts in land use, mounting pollution, and declining biodiversity, have taken a toll on the Mediterranean Basin. Present trends and future forecasts highlight substantial and growing dangers across five intertwined impact domains: water, ecosystems, food, health, and security (Cramer et al., 2018). Additionally, these developments cast a shadow over the future of the region's populace, economic vitality, social stability, and overall human security, potentially leading to violent conflicts (Scheffran & Brauch, 2014). This situation prompts critical questions about how Southern Mediterranean countries are addressing these undeniable risks, particularly their ability to develop and execute green transition policies.

Despite efforts to comprehensively grasp the full extent of the environmental hazards by merging insights from diverse scientific disciplines, numerous challenges hinder the creation of sustainable green policies in Mediterranean countries. This is particularly true for the most vulnerable Southern Mediterranean countries, where systematic observation schemes and impact models are scarce. This policy paper delves into the potential green energy transition in Lebanon and Syria, chosen for their ability to lead the shift towards sustainable energy. However, both nations face significant hurdles, including the absence of a robust legal framework and persistent economic and political instability.

On the other side, green energy is vital as it reduces dependence on fossil fuels while enhancing access to cleaner energy sources. Transitioning to green energy is essential because it generates significantly fewer greenhouse gases and air pollutants throughout their entire life cycles compared to fossil fuels (TWI, 2023). Although the initial investment in green technologies is more costly than conventional sources, the widespread use of energy and the current trend towards sustainable innovation have created numerous entrepreneurial opportunities (Johnston, 2023). This policy paper acknowledges the pivotal role of entrepreneurs in advancing green energy and offers recommendations for policies that engage all relevant stakeholders, laying the foundation for a meaningful transition in Lebanon and Syria. The following sections present the countries' contexts and existing policies, explore challenges facing the entrepreneurial sector, and discuss insights from experts in green energy and entrepreneurship before offering policy recommendations.

## LITERATURE REVIEW

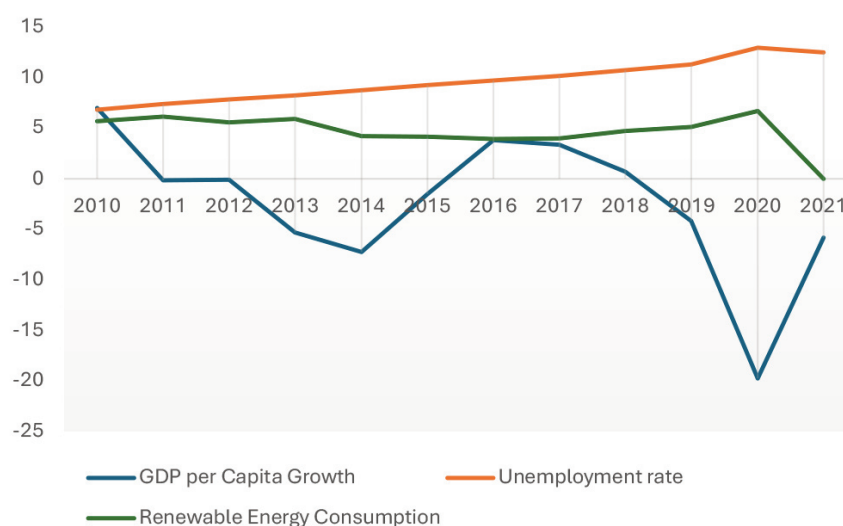
Lebanon and Syria, two Southern Mediterranean countries, are each facing several challenges that have made development very slow. These nations have played formative roles in shaping the political landscape of the Middle East, and they continue to face a wide range of difficulties and political upheaval. As the world progresses toward a more sustainable future, the two countries are at distinct stages in the energy transition. Although Lebanon has made some progress in embracing renewable energy sources and implementing energy efficiency measures, Syria has lagged due to its frequent conflicts and political instability. In the sections that follow, the context and the economic facts of the two countries are presented to provide a better understanding of the topic at hand. Furthermore, the existing policies in the green energy sector and the challenges that hinder the progress of entrepreneurial activities are discussed.

### LEBANON AND SYRIA; CONTEXT AND FACTS

**Lebanon** has been mired in political conflicts and internal crises for years. The country's economic activity took a severe decline after capital inflows abruptly halted in October 2019. The Beirut Blast and Covid-19 lockdowns further exacerbated the situation, leading to a staggering real GDP decline of over 21.4% in 2020 and another 5.4% in 2022, with projections indicating further drops in the following years (World Bank, 2021). The unemployment rate more than doubled, reaching 13% in 2020 due to the financial crisis (ILO, 2020). The mounting public debt, coupled with budget deficits, corruption, and a lack of robust policies, led to a severe depreciation of the domestic currency starting in the last quarter of 2019. In 2020, the fiscal deficit surged by \$1.38 Bn, tax revenues plummeted, and government spending decreased by 0.23% year-over-year in April (BLOMINVEST, 2020). The aftermath of the 2019 economic and financial crisis continues to unfold, with real GDP expected to contract by an additional 0.5% in 2023 (Al-Saeed & El Khalil, 2023). The turmoil has impacted all productive sectors, including entrepreneurs, who face significant challenges in investing and growing due to the frequent political issues and unstable legislative environment, particularly in the green energy sector.

**Table 1** provides quantitative data on the major economic indicators, mainly GDP per Capita, Unemployment rate and renewable energy consumption in Lebanon. It is evident that GDP per capita decreased and unemployment rate has increased after 2017-2018. At the same time, while renewable energy consumption had started to increase due to the crisis and the shortage in electricity, in 2020 it decreased again due to the lack of financing.



**Table 1.** Economic Indicators of Lebanon

Data Source: World Bank – [www.worldbank.org](http://www.worldbank.org)

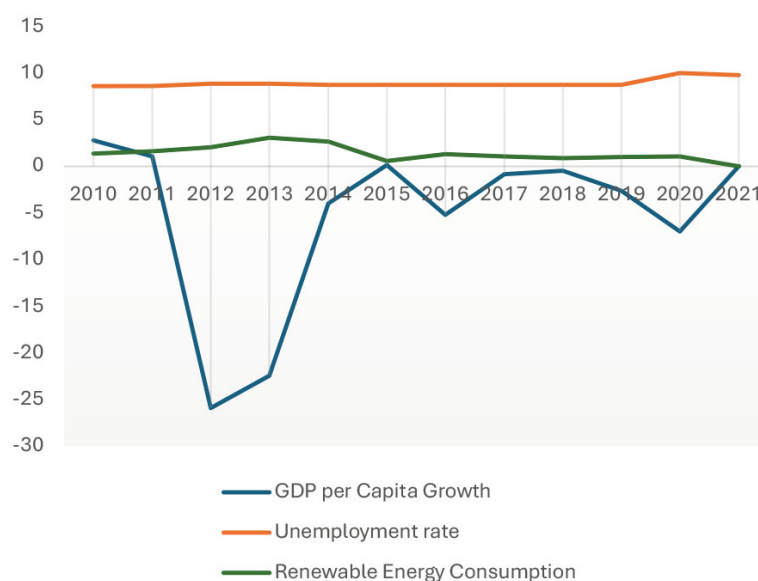
Despite Lebanon's pledge to boost renewable energy usage and cut greenhouse gas emissions by 30% by 2030, tangible progress remains elusive (UN, 2020). The transition process is hampered by a lack of expertise, technology, funding, and regulatory frameworks. Consequently, efforts have largely been confined to projects funded by international grants and carried out by International Non-Governmental Organizations (INGOs). Data available up to 2021 indicates that in 2019, Lebanon consumed approximately 8.614 million tons of oil equivalent (Mtoe) of energy, with the lion's share dedicated to electricity production. The country's energy independence rate stands at a mere 4.69 percent, with a per capita energy consumption of 0.8 tons of oil equivalent and a per capita electricity consumption of 1540 kilowatt hours (kWh). The year 2021 experienced a dramatic 25% reduction in global energy consumption due to the combined impacts of an economic downturn, financial crisis, and the removal of energy price subsidies (WorldData, 2023).

Lebanon's reliance on imported petroleum products, primarily refined petroleum, underscores the country's energy vulnerability. In 2017, Lebanon imported 8.5 million metric tons of oil products. However, projections for 2021 show a significant decrease, with expected imports of around 5.1 million metric tons. This dependency on fossil fuel imports, mainly for electricity production, reveals the cracks in Lebanon's energy infrastructure. High generation and operational costs, inefficiency, and poor governance have led to a crumbling energy sector, exacerbating the country's economic, budgetary, and financial crises. Situated at the crossroads of regional conflicts, often fueled by battles over energy resources (Yergin, 2020), Lebanon's energy landscape is fraught with instability. The economic downturn has severely depleted foreign currency reserves, making electricity subsidies an overwhelming burden on the national budget (Ersoy et al., 2021).

**Syria's** prolonged and devastating civil war has severely impacted its infrastructure and economy (Burgis-Kasthala, 2019). The combination of war, internal conflicts, mass displacement, and the collapse of economic activities has led to a sharp decline in production. Real GDP is anticipated to shrink by 3.2% in 2023 (World Bank, 2023), while the unemployment rate, already at 21.85% in 2021, is expected to rise even further (CEIC, 2023). Over 90% of the population now lives in poverty, struggling with the lack of shelter, employment, healthcare, education, and clean water, all of which have eroded their purchasing power. The pervasive political instability and conflict pose significant challenges for entrepreneurs, particularly in establishing and sustaining businesses in the energy and green sectors (Burgis-Kasthala, 2019; 2022, *النفرة*).

**Table 2** indicates a huge fluctuation in GDP per Capita starting 2011, when the war took place in the country, and the unemployment rate has been increasing, although the information provided by the national sources indicates an increase starting 2019. Renewable energy consumption stays shy in Syria compared to other countries of the world.

**Table 2.** Economic Indicators of Syria



Data Source: World Bank – [www.worldbank.org](http://www.worldbank.org)

The conflict in Ukraine has driven up commodity prices, worsening Syria's fiscal and external positions while fueling inflation in a country that imports nearly half of its oil and a third of its cereals. This surge in food and essential goods prices has forced the government to tighten spending policies, further straining an already vulnerable population. Syrian households are facing heightened insecurity, with women, young people, and the elderly—despite being heavily represented in the labor force—especially at risk due to their limited earning potential (World Bank, 2023). The persistent security challenges in Syria have severely hampered development, with humanitarian aid dominating the activities of NGOs and

INGOs. As a result, entrepreneurial ventures, particularly in the green energy sector, are progressing at a frustratingly slow pace.

Oil and natural gas are Syria's main sources of electricity. An annual average of 613 kilowatt-hours (kWh) of electricity is used per resident, for a total annual consumption of 13.07 bn kWh (WorldData, 2023). Before the wars and crises, Syria had achieved complete energy independence by using only power generated within the country. Oil and gas production and exports fell sharply because of disruptions caused by the conflict (WorldData, 2023). Since the civil conflict began, Syria has been subject to international sanctions that have hindered its energy sector and its capacity to import energy resources and technologies for the development of energy infrastructure. In the section that follows the existing policies in the green energy sector for Lebanon and Syria are explored.

### **ENERGY SECTOR: PLEDGES AND POLICIES**

Lebanon has set its sights on an ambitious energy transition to tackle its unique energy challenges and foster sustainability. However, the nation's severe financial and economic crisis has stalled these efforts this year. Meanwhile, Syria's ambitions of an energy transition were shattered by the ongoing civil war, plunging the country into a severe energy crisis.

Lebanon emerged as a pioneer in promoting renewable energy (RE) back in 2010, driven by its rich abundance of wind, solar, and hydropower resources. This initiative was further strengthened through the National Energy Efficiency Action Plan 2011-2015 (NEEAP), where Lebanon set specific targets for energy efficiency and renewable energy development (Ersoy et al., 2021). Aiming for 12% of its electricity to come from renewable sources by 2020, the Lebanese government launched the National Renewable Energy Action Plan (NREAP) in 2016. This strategy included ambitious goals for integrating solar, wind, and biomass energy. However, ongoing political instability and a severe economic crisis have hindered the achievement of these targets (Ersoy et al., 2021; World Bank, 2021).

Lebanon has set an ambitious goal to achieve 30% of its primary energy consumption from renewables by 2030 (IRENA, 2020). On March 29th, 2019, the government ratified the Paris Agreement and submitted the ratification instrument to the United Nations (UNDP, 2021). With international assistance, Lebanon aims to implement energy-saving measures that will reduce greenhouse gas emissions by 30% and cut electricity consumption by 10%. Additionally, the government plans to lower its greenhouse gas emissions by up to 20% and reduce power demand by 3% by 2030, compared to a business-as-usual scenario (Ersoy et al., 2021).

Persistent electricity shortages in Lebanon can be attributed to the poor performance of Electricité du Liban (EDL). Over 53% of emissions from the power sector come from private diesel generators, which are both costly and polluting (Ahmad et al., 2021). The Lebanese electrical sector faces three major challenges: an unreliable power supply, a skewed subsidy system, and a lack of financial stability at the utility level.

Reforming Lebanon's energy sector is inseparable from addressing the country's political issues. Law 462 of 2002, which established an independent Electricity Regulatory Authority to oversee all technical decisions and minimize political interference, has yet to be implemented.

Lebanon's policies promoting green energy are scarce and lack concreteness. The Ministry of Energy and Resources has been advocating for solar energy through various initiatives, such as solar water heaters and solar photovoltaic (PV) installations, including the net metering system approved by EDL's board in 2011. However, the net metering market has struggled to gain momentum due to numerous technical and administrative challenges. The Lebanese Center for Energy Conservation (LCEC) has supported solar energy programs and provided financial assistance for solar installations. Despite the severe economic crisis and the removal of fuel price subsidies, the LCEC predicts that Lebanon's solar rooftop capacity will surpass 1 GW by the first 10 days of June 2023 (Tsagas, 2023).

Beyond the untapped potential of renewable and native hydro resources, Syria's energy sector is primarily dominated by fossil fuels. For decades, domestic oil and gas fields have been the backbone of Syrian energy. However, domestic oil production experienced a sharp decline between 1996 and 2005, dropping from approximately 600,000 to 400,000 barrels per day. Electricity demand has surged at a rate of 6% per year, driven by population growth, economic shifts, and technological advancements across all consumption sectors. Increased automation in industry, higher personal automobile ownership, and the widespread use of electric appliances in homes and the service sector have contributed to this demand, reflecting overall improvements in the quality of life.

Unfortunately, damage to energy infrastructure and international sanctions have severely curtailed oil and natural gas production over the past five years. Despite these challenges, Syria has long recognized the importance of renewable energy. Since 2002, when the government set a target for renewable sources to account for 4.3% of the total primary energy supply by 2011, incorporating renewables has been a key part of Syria's energy strategy. The 11th Five-Year Plan (2011-2015) emphasized the use of renewable resources in power plant construction. Additionally, the United Nations Development Program's (UNDP) Supply-side Efficiency and Energy Conservation and Planning project ran from 1999 to 2005, further supporting these efforts (IAEA, 2023).

Syria has several laws aimed at advancing energy conservation and renewable energy. Law No. 3 of 2009 focuses on spreading and implementing energy-saving practices, such as reducing energy waste, extending the lifespan of energy sources, and enhancing energy efficiency. Law No. 32 of 2010 seeks to attract investments in electricity generation and distribution, opening opportunities for public, joint, private, local, Arab, and foreign sectors to support societal and economic needs.

To boost the use of renewable energy and improve energy efficiency, legislation was introduced to establish a renewable energy fund. However, this law has yet to be fully implemented (Electricity, 2021). Meanwhile, Law 23/2021, signed by the President of Syria, officially created the Renewable Energy Fund. This organization, with its own board of directors, is designed to provide financial products like interest-free or subsidized loans, encouraging consumers to transition away from hydrocarbons. The Fund's budget will be

supported by state contributions, energy usage fees, donations, and other sources. These funds can be allocated to households, farms, factories, or organizations providing essential services, fostering a shift towards sustainable energy practices (SLJ, 2021). Lebanon has demonstrated dedication to switching to renewable energy sources, while Syria has been attempting to enter the market of renewable energy, but each country faces unique hurdles that have slowed their progress.

## ENTREPRENEURIAL CHALLENGES IN THE GREEN ENERGY SECTOR

South Mediterranean entrepreneurs have a great opportunity to build a prosperous green economy that uses renewable energy sources especially in the countries that lack solid public plans, and the governmental institutions are almost absent. Entrepreneurship in Lebanon and Syria faces several hurdles and barriers that set the sector behind compared to many other countries of the world. The difficulties discussed in this section are presented under three categories: policies and laws; skills; and finance.

Entrepreneurs in the South Mediterranean countries have a unique opportunity to build a thriving green economy powered by renewable energy sources, particularly in countries where public plans are weak and governmental institutions are nearly non-existent. However, entrepreneurship in Lebanon and Syria faces numerous challenges, lagging many other nations. These challenges can be grouped into three main categories: policies and laws, skills, and finance.

### Policies, Laws, and Administrative Concerns

Most South Mediterranean countries, including Lebanon and Syria, grapple with weak and inconsistent policy frameworks. Frequent political upheavals and shifting regulations create uncertainty, deterring entrepreneurs from engaging in long-term planning and investment (Bashi et al., 2023; Schwanitz et al., 2023). Both Lebanon and Syria struggle with outdated energy infrastructure, making it difficult to integrate renewable energy sources into their existing systems. The expansion of the energy sector and the adoption of renewable technologies face significant challenges, including insufficient grid capacity, aging transmission networks, and limited access to electricity in rural areas.

Investors and business owners alike are wary of the energy and green economy because of the frequent government changes and policy unpredictability. Lebanon's and Syria's attempts to implement ambitious green energy strategy are hampered by government instability. The lack of political will and commitment to a green economy transition is a fundamental obstacle. Previous attempts at EU-Med cooperation, such as the Mediterranean Solar Plan and Desertic, bothered critics for failing to produce tangible results and being overly focused on the EU. These criticisms were compounded by the numerous economic and geo-political constraints. (Escribano, 2016; Herranz-Surrallés, 2018; Herranz-Surrallés, 2021; Proedrou, 2019; Rubino, 2021).

Lebanon faces significant challenges due to uneven legislation and weak enforcement mechanisms. The nation has set ambitious goals for energy efficiency and renewable energy, but the sector's growth

is hampered by a complex mix of economic, social, and geopolitical issues (Ersoy et al., 2021). In rural areas, renewable energy is primarily utilized for traditional biomass heating, and inefficient hydroelectric power plants (IRENA, 2020). Additionally, due to an inadequate public power network and insufficient infrastructure, most new renewable energy installations are distributed solar rooftop PV systems. This leads to considerable power loss when the batteries reach full capacity (Tsagas, 2023).

The absence of a robust legislative framework specifically designed for the energy and green sector poses a significant barrier to entrepreneurial activities and deters investors. Both Ersoy et al. (2021) and Saade et al. (2019) highlight that Lebanon frequently experiences power outages due to inadequate energy infrastructure. The lack of government support and unsustainable energy policies further stymie entrepreneurial efforts in the energy sector.

Although recent efforts have largely concentrated on immediate relief and addressing emergency issues due to the economic and financial crisis and the influx of Syrian refugees (Mawad & Makki, 2023), Lebanon has sought assistance from international partners and organizations to fund and support energy projects. Several studies conducted on green energy transmission before the economic crisis of late 2019 have revealed promising opportunities in the sector (El Chaarani & Raimi, 2022), Lebanon has since sought collaboration with organizations such as the United Nations Development Programme (UNDP), the European Union (EU), and the World Bank to advance the energy sector. These partnerships aim to support sustainable energy initiatives and enhance the resilience of the energy sector (Elmustapha & Hoppe, 2020).

Historically, State-Owned Enterprises (SOEs) in Syria have overshadowed the entrepreneurial sector, which has had to forge its own path despite administrative and funding challenges. This has resulted in a landscape where most startups and small enterprises remain informal, and struggle with basic expenses. Consequently, and given that the country is still passing through internal war, these enterprises find it difficult to integrate into the formal economy and take advantage of free market opportunities. The success of the entrepreneurial sector is deeply intertwined with the policy, legal, institutional, and regulatory frameworks that shape how small businesses can start and grow. Unfortunately, the overly complex and unjust policy and regulatory environment in Syria undermines the potential of small and medium-sized enterprises (SMEs) (Goheer & Seifan, 2009).

The Syrian government has tightened its grip on energy access, carefully rationing supplies to individuals and institutions while increasing both official and black-market prices of oil and its products. This has plunged Syrians into daily struggles, grappling with harsh rationing and dwindling allocations as the regime battles an ongoing conflict (Electricity, 2021). Navigating the treacherous waters of Syria's regulatory climate is a Herculean task for businesses, with the instability making it nearly impossible to secure licenses and permits for energy or green initiatives. The civil conflict has wreaked havoc on the country's infrastructure, particularly in the energy sector. Inadequate access to power networks and renewable energy facilities stifles potential, curbing business opportunities in the sector (UN, 2022).

### **Skill Gaps in the Green Energy Sector**

Investment in green and innovative sectors is less likely than investment in conventional sectors due to a shortage of skilled labor skills and weak ecosystems (Vizoso, 2021). Specialization in project management, engineering, and the development of new technologies are just a few examples that are essential to a smooth green transition (Goldthau & Hughes, 2020). Both Lebanon and Syria suffer from a lack of professionals with the necessary expertise in the energy and green industry. A lack of specific training and education programs for renewable energy technologies may hinder entrepreneurial endeavors.

Lebanon's educational system is showing great promise in expanding access to renewable energy courses. Several Lebanese universities have already launched or are planning graduate programs in this burgeoning field (UNDP-CEDRO, 2015). However, many lawmakers, bankers, and decision-makers still lack the necessary knowledge and experience in renewable energy (Elmustapha et al., 2018; UNSD&ESCWA, 2019). The lure of higher wages abroad, especially in the Gulf countries, attracts many highly skilled engineers, leading to a talent drain (Elguindy, 2020; Ersoy et al., 2021).

Environmental studies were integrated into the curriculum during school reforms in 1998, increasing the number of courses available in this area (Ersoy et al., 2021). However, rapid technological advancements necessitate a significant update in the curricula to ensure the accommodation of the up-to-date developments. Over the past decade, the private sector has shown a clear demand for renewable energy expertise, leading to the establishment of groups such as the Lebanese Association for Energy Saving and for the Environment (ALMEE) that seeks to pioneer, enhance, and champion scientific methods and strategies that drive smarter energy management and invigorate related economic policies; and also, the Lebanese Solar Energy Society (LSES) which works to uncover sustainable energy alternatives and supercharge Lebanon's solar energy market. In addition, and in efforts to develop national standards, businesses have set up several testing facilities, collaborating with the Industrial Research Institute (IRI) and the Lebanese Standards Institute (LIBNOR) (UNDP-CEDRO, 2015).

The prolonged conflict in Syria has triggered a massive brain drain, with educated and experienced professionals fleeing the country. This exodus stems from weak infrastructure, lack of technological advancements, limited access to funding, and a shortage of skilled workers. Renewable energy projects, unfortunately, suffer from poor implementation and management due to this lack of expertise in the energy and green industries (Tozan, 2023).

Lebanon and Syria both face significant challenges in securing research and development resources and funding for the energy and green economy. This scarcity hampers access to technical expertise, innovation support, and collaboration opportunities for entrepreneurs (Liu et al., 2023; Luo & Zhang, 2022). While Europe prioritizes education, vocational training, and scientific institutions to nurture growth in the energy and green sectors—ensuring a steady supply of skilled labor for new ventures (Bogoslov et al., 2022; Kowalska et al., 2022)—Lebanon and Syria struggle with skill gaps and a lack of specialized training programs. Entrepreneurs in Lebanon and Syria encounter significant obstacles in finding skilled workers due to an underdeveloped educational infrastructure and insufficient vocational training options.



This stunted growth of a qualified workforce in the energy and green sectors makes it challenging to develop and commercialize new ideas.

### **Lack of Sustainable Funding Sources**

Many Southern Mediterranean countries face significant hurdles in securing funding for renewable energy projects. The high costs of relevant technology and infrastructure, compared to conventional energy sources, make investment a daunting task. The region still grapples with a substantial investment gap to meet the 2030 renewable energy targets, needing an additional USD 16 billion annually—approximately 30% more than the pre-COVID-19 investment levels (Zhongming et al., 2020).

In Lebanon, entrepreneurs in the energy transition sector grapple with a significant funding shortfall. Securing low-interest, long-term financing is a challenge due to limited collateral, poor credit, and high interest rates. The Lebanon Energy Efficiency & Renewable Energy Financing Facility (LEEREFF), funded by the Banque du Liban, steps in to mitigate this issue by offering competitive loans for renewable energy projects (LEEREFF, 2019). However, the economic, financial, and social crisis that began in the fall of 2019 has severely hampered these efforts (WorldBank, 2021).

In war-torn Syria, the ongoing conflict and political instability present even greater barriers to investment in the energy transition sector. Despite the scarcity of specific initiatives targeting sustainable funding sources, international organizations and donor countries occasionally step in with grants to support renewable energy projects, striving to promote sustainable development amidst the chaos (Ankir, 2022; de Lange et al., 2021; Kachkar, 2019; Soliman et al., 2023).

Access to finance is a significant hurdle for entrepreneurs in the energy and green sectors in Lebanon and Syria (Liu et al., 2023). However, the international community is stepping in to provide funding for the entrepreneurial activities of Syrian refugees in Lebanon and other host countries, though reports of such funding within Syria are non-existent (de Lange et al., 2021; Kachkar, 2019).

In contrast, other Southern Mediterranean countries boast well-established financial institutions offering a variety of funding mechanisms for green startups and projects. Egypt and Morocco stand out as top recipients of green funding, securing 29% and 19% of the region's total approved climate finance, respectively (Watson & Schalatek, 2021).

Despite ongoing efforts in the Southern Mediterranean region, many countries continue to grapple with inadequate legal frameworks for nurturing the green energy sector. Ineffective regulations and lax enforcement of existing limits hinder the growth of renewable energy sources. The European Union finds it challenging to export its regulatory models due to the already complex array of instruments and frameworks in place for energy transitions in the region (Herranz-Surrallés, 2021; Weatherby et al., 2018). Additionally, the region's underdeveloped infrastructure, particularly in rural areas, creates barriers to the expansion and distribution of renewable energy. There are simply not enough facilities for storing renewable energy or networks for its distribution (Zhongming et al., 2020).



Furthermore, investing in human capital and building a strong, cutting-edge infrastructure, along with all its accompanying financial and non-financial elements, are the keys to accomplishing the goals of the energy transition, which startups and SMEs play a vital role in achieving. They have the potential to dramatically reshape society if the appropriate legal, investment, regulatory, educational, and other support structures are in place. Further, implementing the necessary infrastructure and “infostructure” in a timely, efficient, and institutionalized manner is crucial for scaling up (Kamel, 2022; Rizk & Kamel, 2013).

## RESEARCH METHODOLOGY

In this policy paper, a theory-based approach is developed to utilize the mixed-methods data; primary and secondary data, needed to assess the grounds, to provide lessons learnt and recommendations as a basis for drafting new green energy policies for the selected countries Lebanon and Syria. The process starts with understanding the context of the selected countries to develop a concrete understanding of the existing green policies and to better comprehend the challenges and constraints that hinder the transition towards a better green energy sector.

To delve into the sector's realities and explore how entrepreneurship can facilitate a smoother transition, we conducted Key Informant Interviews (KIIs) and focus group discussion with experts from Lebanon and Syria. We carefully assembled a panel of experts with diverse and complementary backgrounds to provide a rich, well-rounded perspective on the challenges and opportunities at hand. The experts include:

- Marc Ayoub, a project coordinator and energy policy researcher at AUB Issam Fares institute. Marc brings a wealth of knowledge in evidence-based research and a specific focus on shaping energy policy in Lebanon, particularly advocating for a national strategy centered on renewables.
- Samer Aswad, the co-founder of Afkar Plus, contributes entrepreneurial expertise and consulting experience with FAO, UNDP, and other INGOs.
- Nancy Saliba, the director of the ACHER Center at Holy Spirit University of Kaslik, offers insights from her extensive experience in managing support programs, with a keen awareness of collaborative efforts with EU partners to establish regulations in the industry.
- Lynda Achkouty, an internationally certified business coach and partner at Action COACH, provides a unique perspective on the intersection of business and sustainability.
- Ghaith Yasine, Sanad's entrepreneurship specialist for Damascus and Aleppo.
- Mohammad Nour Al Adlabi, Afkar Plus project coordinator and entrepreneurship specialist, to bring regional expertise and insights into the entrepreneurial landscape, ensuring a holistic approach to our policy recommendations.

Together, these experts form a well-rounded and multidisciplinary team, poised to contribute valuable insights to our policy paper. The information gathered and the opinions recorded, along with some benchmarking of EU policies, allowed the recommendations that are made in this paper.

## KIIS AND FOCUS GROUP

### INTERVIEW WITH MARC AYOUB

**Marc Ayoub** is a Project Coordinator and Energy Policy researcher at AUB Issam Fares Institute, focused on evidence-based research to shape policy in Lebanon. He advocates for a national energy strategy centered on renewables.

Marc highlighted that the transition to a green energy sector has been significantly impacted by the ongoing economic and financial crisis. The crisis has heightened awareness of renewable energy's importance, as the cost of alternatives to public electricity has soared, making solar energy both feasible and affordable. However, the adoption of solar panels has been chaotic and unregulated, adding new layers of complexity to the existing challenges.

In Lebanon, the green energy sector is hampered by a lack of robust regulations. Under law #462, no permits are needed for production up to 1.5 megawatts. The Distributed Renewable Energy Law, active since 2019, is still under debate for any production exceeding this threshold among legislators, the government, and other stakeholders. Marc is optimistic that this law, which would permit renewable energy production of up to 10 megawatts and facilitate private electricity transfers, will be enacted once the country stabilizes. Currently, most solar installations in Lebanon serve residential purposes. Although no electricity is being exported, it is estimated that around one terawatt-hour of power is lost annually as households waste energy and underutilize their batteries. This not only denies people access to valuable resources but also underscores the need for a net metering system and supportive legislation to ensure that excess energy can be integrated into the grid. The establishment of a backbone organization to oversee implementation could further enhance the sector's efficiency.

Finance emerges as the second major challenge. Since the crisis began in 2019, around \$700–\$800 million has been invested in solar energy, largely funded by personal savings or asset sales. Unfortunately, government agencies have yet to offer any financial support due to the lack of public finances, and donor interest in backing small and medium-sized enterprises (SMEs) or other initiatives remains tepid. The future lies in community-based projects, which will demand significant funding. Another challenge lies in the political economy of the country, particularly concerning the monopolies that could form around solar-powered electricity. There's a pressing need to clarify whether these monopolies might fall into the hands of politically connected individuals. Transparency in how these developments are managed is crucial for ensuring fair and equitable access to solar energy.

The green transition is being hampered by several factors: subpar equipment quality, installation chaos, unreliable batteries, and a surge of inexperienced newcomers. While solar panels boast a potential

lifespan of ten years, batteries typically need replacement or disposal every 3–5 years. Currently, there is no legal framework or infrastructure for recycling these batteries. Marc highlighted that the Lebanese Center for Energy Conservation (LCEC) website specifies that firms must obtain approval from the Ministry of Energy to ensure equipment compatibility. Although there is a ban on importing used panels, this regulation is poorly enforced. Marc attributes this oversight to the massive economic crisis, which has crippled the government's ability to conduct thorough inspections and evaluations. Marc asserts that genuine green transformation hinges on national macroeconomic stability. Without it, we will only witness localized, grassroots efforts that will depend on time and financial support from the diaspora or external donors. Immediate action is needed to monitor solar equipment quality and establish a regulatory framework for recycling. Additionally, there must be clear guidelines on land use for energy infrastructure. In collaboration with the American University of Beirut (AUB), a team of researchers has mapped out ideal locations for solar and wind farms. Once a developer secures a power purchase agreement (PPA), they can rent the necessary land, with these costs factored into the retail price of energy. By selecting the right public land and incorporating it into the tender process, developers can lower costs and ensure effective installations.

Marc also advocates for reforming Electricity De Liban. The network must be updated to accommodate the growing popularity of decentralized solar power, which will modestly influence future demand even as the economy grows. Furthermore, Marc highlights the need for a stronger role for academic institutions and innovation centers to mentor and support startups in renewable energy and energy transitions, offering a solution to the country's pressing challenges.

## INTERVIEW WITH SAMER ASWAD

**Samer Aswad** is the co-founder of Afkar Plus, he works in the entrepreneurial field, and he serves as a consultant with FAO, UNDP, and other INGOs.

According to Samer, Syria's situation mirrors Lebanon's in many ways. Before the war, residents enjoyed a steady supply of cheap, subsidized electricity. Those days are long gone; by 2015–2016, Aleppo was the first city to lose power, followed by the rest of Syria. As government electricity became a distant memory, generators began cropping up across the country. In response to the power vacuum, renewable sources like solar energy quickly stepped in. Given Syria's high CO<sub>2</sub> emissions from generator fuel and enormous energy consumption, solar power has become a crucial alternative. Wind energy investments are also sprouting up in areas where testing has commenced.

Samer noted that funding for solar projects primarily comes from private sources. A new regulation permits the use of tax-exempt land for electricity production, including supplying the public grid from which the government buys power. Despite this decree, its implementation is still pending. Currently, public solar facilities in Reef Hamah and Salamyeh produce just 2 MW per day, barely enough to power a few homes. While solar panels are imported, there's potential for local manufacturing to meet domestic

demand and even export excess. Most investors are Syrian, with some hailing from neighboring Lebanon and Iraq.

Solar panels are now a common sight in private homes, but the sector remains chaotic and unregulated. With no organized framework or municipal oversight, there's a free-for-all of production, installation, and sales. This lack of structure leads to concerns about equipment quality, widespread waste, and general confusion due to the sector's complete lack of control.

When discussing Syria's entrepreneurial landscape, Samer indicated that the ecosystem still in its infancy, only beginning to take shape after 2012. The absence of enabling legislation and cautious investment are significant constraints, further strained by the country's macroeconomic and political challenges. The swift depreciation of the Syrian lira could present a golden opportunity if not for the legal prohibition against using US dollars for domestic transactions, despite the relentless rise in inflation. While International Non-Governmental Organizations (INGOs) can bring in US dollars for humanitarian efforts, they must exchange them at the official rate, significantly lower than the black-market rate. The result is an uninviting investment environment, leading to a trickle of investment in new ventures, far below the potential if a more supportive framework were in place.

Samer highlighted that energy needs have become essential for securing government funding for startups and SMEs. Initially, support came in the form of generators, but with soaring fuel costs, the focus shifted to solar energy. INGOs are now installing solar panels to bring electricity to rural communities, which have been devastated and left powerless. On another front, some startups are investing in recycling, but the lack of awareness in this field is slowing progress, and universities aren't heavily investing in this area either. Samer emphasized that beyond the crucial macroeconomic stability needed to uplift the country and the green energy sector, there's a pressing need for increased awareness. This shift in mindset could transform the perception of solar energy from merely an alternative to conventional electricity to a primary source for local power production.

#### **FOCUS GROUP FEATURING NANCY SALIBA, LINDA ACHKOUTY MOAWAD, GHAITH YASEEN, AND MOHAMMAD NOUR AL-ADLBI**

This section of the policy paper presents insights gathered from a focus group discussion that delved into the intricate challenges faced by entrepreneurs in the energy transition sector in Lebanon and Syria. Entrepreneurship experts and key figures from both countries shared their perspectives on the hurdles startups in the energy sector encounter. They also proposed policy changes to create a more conducive environment for these startups. Nancy and Lydia provided insights into the Lebanese context, while Ghait and Mohammad contributed their expertise on the Syrian landscape.

Nancy, the director of the ACHER Center at Holy Spirit University of Kaslik, emphasized the lack of dedicated regulatory authorities as a major concern for managing the complexities of energy transition, renewable energy, and energy efficiency in Lebanon. With her extensive experience in managing support

programs, she acknowledged ongoing efforts with EU partners to establish industry regulations. However, Nancy pointed out a significant challenge: the heavy reliance on donor assistance, particularly from the EU. This dependence limits the scope and impact of initiatives. She also highlighted the issue of regional program redundancies, using an example involving multiple Mediterranean countries. Such duplications, she noted, inadvertently hinder business development post-program, making it difficult for startups to stand out in an already crowded market.

Nancy underscored the critical need to educate the public about environmentally friendly technologies and their potential to reduce utility bills and pollution. While praising the efforts already made in Lebanon, she called for more initiatives. Nancy described activities such as site visits and networking events, designed to attract funders in innovative ways. These interactions, she noted, showcased the significant impact startups have on the economy, environment, and society.

She emphasized the importance of alignment among innovation support organizations and the value of collaboration over competition. Working together, she argued, is key to persuading governments and regulators to adopt policies that recognize the societal and environmental benefits of funded startups. Nancy mentioned collaborations with groups like Beyond Group and academic institutions to highlight the need for further policy modifications.

Turning to the challenges startups face, Nancy highlighted their struggle to grow amidst political and economic instability. She pointed out that many startups establish operations outside Lebanon due to difficulties in obtaining licenses and navigating political complexities. Additionally, she discussed their challenges in accessing funding and the lack of readiness to attract investment.

Lynda, an internationally certified business coach and partner at Action COACH, echoed Nancy's call for youth awareness and engagement. She highlighted the importance of harnessing the creativity and energy of young people to address critical issues like climate change. Drawing from her experience working with youth, Lynda emphasized the value of supporting their efforts to develop innovative products and services. She recognized the necessity of continued access to resources even after program completion, stressing the importance of idea validation through rigorous evaluation processes post-launch. Lynda advocated for collaboration among universities, research institutions, and entrepreneurs to develop effective policies.

Lynda also pointed out the challenge of obtaining reliable data, emphasizing the need for accurate market insights to make informed decisions. She underscored the importance of mentoring young entrepreneurs to ensure grant money is used efficiently, preventing waste and maximizing outcomes. On the other hand, Ghaith Yasmine, the entrepreneurship specialist for Damascus and Aleppo, highlighted the need for a comprehensive understanding of Syria's entrepreneurial landscape. He identified two key areas of importance. First, he pointed out the critical role of accessibility and policy frameworks. Ghaith noted that Syria's entrepreneurial ecosystem lacks clear definitions in terms of policies, financial channels, human capital, and market dynamics. Second, he emphasized the need to educate young people on the true nature of entrepreneurship. Ghaith addressed the common misconception that

entrepreneurship is merely about generating new ideas. He stressed the importance of broadening this definition to include innovative service delivery and problem-solving approaches. Moreover, Ghaith highlighted the significance of creating a safe environment that fosters the swift launch of projects and the acceptance of moderate risks, encouraging a more dynamic and resilient entrepreneurial spirit in Syria.

Ghaith also indicated that Syria lacks institutions dedicated to promoting entrepreneurship. Few organizations operate in this field, and both individuals and institutions remain largely unaware of the entrepreneurial landscape. He suggested that universities could play a crucial role in this ecosystem, though their involvement has been inconsistent. To foster entrepreneurship in Syria, Ghaith emphasized the need to raise awareness, improve policies, and strengthen support networks.

Acknowledging Syria's entrepreneurial deficit, Ghaith noted that energy-related projects have faced significant challenges over the past three years. Entity limitations have hindered market entry, and fierce competition from major importers has posed additional obstacles. He mentioned efforts in developing new batteries and recycling initiatives that were inexplicably halted, illustrating how humanitarian and business donations sometimes prioritize relief activities over entrepreneurial ventures.

Ghaith concluded by sharing a recent experience of educating young people in collaboration with an organization. He expressed concern over the focus on mediocre entrepreneurship ventures, criticizing the tendency to overlook truly innovative projects. He called for a mindset shift, pointing out how some projects are labeled "entrepreneurial" simply based on the producers' nationality. Ghaith highlighted the need to recalibrate Syria's evaluation and support mechanisms for entrepreneurial initiatives.

Mohammad Nour Al Adlabi, the Afkar Plus project coordinator and entrepreneurship specialist, shared insights on the entrepreneurial landscape in Syria, particularly in Hama. He observed modest development across various provinces but noted the chaotic state of Syria's entrepreneurship ecosystem. According to Mohammad, there is a severe lack of coordination among institutions, governments, and international organizations. This misalignment leads to inefficiency and disjointed entrepreneurial efforts. Highlighting the barriers to entrepreneurship, Mohammad emphasized the absence of clear policies and licenses. This regulatory void makes it challenging for enterprises to navigate the system and secure necessary permits. He illustrated how these ambiguous restrictions complicate even basic tasks like obtaining permits, ultimately slowing down project implementation and hindering the growth of the entrepreneurial ecosystem.

Mohammad then delved into the realm of social contributions, casting a critical eye on entrepreneurial policies and institutions. He questioned the criteria these institutions use to select projects, wondering whether precision truly guides their choices. Mohammad highlighted the evolution of support systems and raised thought-provoking questions about the rationale behind favoring certain programs, especially those promising higher financial returns.

Acknowledging the active roles of Syria's official and private universities, he pointed out that the latter often focus more on promotion than on substantive support. Mohammad passionately calls for universities to champion and actively promote the projects of their graduating students. While some Syrian universities have made commendable progress, he emphasized the need for a more comprehensive strategy to truly foster entrepreneurial growth.

Mohammad also explored the green energy transition, advocating for a strong focus on renewable energy and energy-efficient projects. He underscored the environmental and social impacts of these initiatives, questioning both government support and the capacity of startups to revolutionize industry. Mohammad highlighted the urgent need to provide the missing resources and platforms necessary for these ventures to thrive. He asserted that fostering such initiatives, whether by enhancing existing ideas or introducing new ones, is crucial for cultivating a robust entrepreneurial ecosystem in Syria.

Mohammad suggested harnessing municipal resources to drive awareness initiatives, emphasizing that the success of such projects depends largely on the approach taken. He noted that local authorities, institutions, and unions are receptive to coordination and engagement when properly approached, a lesson underscored by the aftermath of the 2023 earthquakes. He further explored the potential benefits of indirect governmental awareness and proposed developing new strategies, including unified platforms and criteria, to support Syrian entrepreneurs, drawing inspiration from the adaptive strategies seen during the COVID-19 crisis.

In the focus group discussion, Nancy, Lynda, Gaith, and Mohammad identified critical challenges faced by startups within the entrepreneurial ecosystems of Lebanon and Syria. Their valuable insights highlight the pressing need to create a supportive environment that nurtures innovation, enhances awareness, fosters collaboration, and enables efficient resource utilization to support entrepreneurs in both countries.



## CONCLUSIONS AND RECOMMENDATIONS

Numerous obstacles hinder the creation of long-term green policies in Lebanon and Syria. Despite sharing similar backgrounds and limitations, Lebanon's ecosystem and entrepreneurial sector are more advanced than Syria's. However, Syrians recognize the importance of this sector and are actively laying the groundwork for its expansion, believing it can significantly bolster the economy, especially given the near absence of initiatives from the official public sector. Political instability, internal conflicts, and a lack of political will and commitment to transitioning to a green economy are major barriers. Additionally, the scarcity of major funding sources, the absence of regulatory frameworks that facilitate investment in renewable energy, weak ecosystems lacking robust green entrepreneurial prospects, and a general lack of awareness about the green economy's significance all contribute to the hesitant shift towards green energy in both countries.

While both countries have indicated that they intent to be in the forefront of the green energy transition, they are far behind other South Mediterranean countries like Egypt. Egypt has made significant strides in planning its green energy transition through a multi-faceted approach. The country has focused heavily on developing renewable energy sources, particularly solar power, and improving energy efficiency. One of the major initiatives includes the construction of the Benban Solar Park in the Aswan Governorate, one of the largest solar parks in the world. This project highlights Egypt's commitment to harnessing its abundant solar resources to generate clean energy. Additionally, small-scale solar solutions have seen increased adoption, with over 129 solar system plants set up across 15 governorates, contributing significantly to the country's renewable energy capacity (Directorate-General for Neighbourhood and Enlargem, 2022). International cooperation plays a crucial role in Egypt's green energy transition. The European Union has partnered with Egypt to develop a strategic framework for renewable hydrogen, which includes infrastructure development and financing to support a robust renewable hydrogen industry. Similarly, the U.S. has been involved in initiatives aimed at accelerating the clean energy transition through policy support and capacity-building efforts (US department of state, 2022).

These combined efforts reflect Egypt's broader strategy to reduce greenhouse gas emissions, enhance energy security, and foster sustainable economic growth. The country is also preparing for future challenges and opportunities by hosting global forums (e.g. like COP27), to showcase its progress and attract further international support for its green energy initiatives (UNDP, 2022).

It is clear that to ensure a seamless and impactful transition to green energy in Lebanon and Syria, a stable macroeconomic and political environment is essential. This requires substantial changes in the public sector, such as economic restructuring, anti-corruption measures, and the development and implementation of appropriate policies. These efforts need to be combined with cooperation and international support.

This policy paper focuses on the roles that stakeholders, including international NGOs, donors, the private sector, innovation centers, and universities, can play in facilitating this transition. Below are the key recommendations:

- 1. Promoting Awareness and Education:** Innovation hubs and educational institutions should actively promote the importance of the green energy sector. This can be achieved through developing new courses, revising curricula, launching joint competitions between academic institutions, and encouraging partnerships with NGOs on funded projects.
- 2. Tracking and Reporting:** Academic institutions should provide annual reports on the growth of green energy startups and SMEs. This helps in understanding the sector and crafting investment opportunities. Additionally, compiling a compendium of best practices and conducting donor-funded research programs, led by universities, can raise community awareness and inspire business owners to adopt green energy principles.
- 3. Blended Finance for Sustainability:** Donors are advised to create blended financial vehicles to ensure the financial sustainability of projects. Blended finance combines public or philanthropic funding with private investment, addressing challenges such as environmental sustainability, gender equality, and poverty reduction. This strategy supports multiple rounds of funding, moving away from traditional grants to zero-interest loans, with repayments reinvested to support more SMEs and startups.
- 4. Encouraging Social Enterprises:** Startup funding is crucial for market investment and job creation. Donors and project planners should encourage the development of social enterprises that not only generate employment but also benefit society and the environment.
- 5. Fostering Collaborations:** Collaborations among startups, SMEs, NGOs, universities, and the public sector are vital. Donors should design collaborative models to fund joint efforts, creating a richer learning environment and better resource access, especially in the green energy field.
- 6. Ensuring Compliance and Effectiveness:** Adherence to standards is essential for a successful transition to green energy. Donors and private sector players should oversee projects to ensure the technologies implemented are effective and do not worsen underlying issues. Local expert committees can monitor and evaluate funded projects.
- 7. Legislative Support:** A supportive legislative framework is needed to help startups and SMEs register their businesses, receive tax discounts, and other support when investing in the green energy sector. Policy advocates and INGOs should provide regulatory ideas and communicate with policymakers, documenting and presenting the positive impacts of these enterprises on the economy.

By implementing these recommendations, stakeholders can significantly contribute to a sustainable green energy transition in Lebanon and Syria.

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