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Rapid Market Scoping of the Renewable and Solar Energy Sector in Jordan

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Executive Summary

This report was developed under the ILO's Manzuma project, funded by RDPP III, which aims to promote inclusive growth and decent work opportunities for Jordanians and Syrian refugees. Building on Market Systems Analyses in three priority sectors, the report unpacks the solar energy cross-cutting sector and identifies strategies can help MSMEs reduce costs, improve productivity, and strengthen competitiveness.

Jordan's renewable energy sector has undergone a significant transformation over the past decade, driven by the country's structural dependence on imported energy and the need to enhance energy security and affordability. Between 2015 and 2020, supportive policies, particularly the introduction of net metering, enabled rapid deployment of solar photovoltaic (PV) systems across residential, commercial, and industrial segments. This growth allowed businesses, including micro, small, and medium-sized enterprises (MSMEs), to reduce electricity costs and improve competitiveness.

Since 2020, however, the sector has entered a new phase characterised by tighter regulatory control and low approvals for Solar Energy projects. Recent reforms, including **Regulation No. (58) of 2024** and the **General Electricity Law No. (10) of 2025**, have redefined the framework for renewable energy deployment. The transition from net metering to net billing, combined with increased network charges, system size limitations, and restrictions on battery usage, has reduced the financial attractiveness and operational flexibility of solar investments.

This report provides a rapid market scoping of the renewable energy sector in Jordan, with a specific focus on MSMEs operating in food services, food processing, and chemicals manufacturing. It examines the evolution of the sector, current regulatory mechanisms, tariff structures, market supply, and financial viability.

Electricity tariffs remain a key driver of demand. Commercial MSMEs, including food services, are subject to a two-tier tariff structure, with consumption above 2,000 kWh billed at 152 fils/kWh. This creates a strong and consistent incentive for cost reduction through solar energy. In contrast, industrial users face differentiated tariff structures, including time-of-use pricing for medium and large consumers, and relatively lower tariffs for small industrial users. As a result, the value proposition of solar varies across sectors, with stronger financial returns in commercial applications and more complex dynamics in manufacturing.

The shift to net billing has made self-consumption the primary determinant of solar system viability. Excess electricity exported to the grid is compensated at significantly lower rates (40 fils/kWh for commercial and industrial users), reducing overall returns and extending payback periods to approximately 4–8 years, compared to 2–5 years under previous frameworks. Additional constraints, including limits on system capacity, high network fees, and restricted control over battery storage, further impact project feasibility.

Despite these challenges, the supply side remains well-developed, with a range of experienced local developers and EPC contractors capable of delivering distributed solar solutions. The market is also witnessing a shift toward more flexible business models, including leasing and solar-as-a-service, which reduce upfront investment requirements for MSMEs.

Demand for renewable energy solutions remains structurally strong, driven by high electricity costs, increasing competitiveness pressures, high photovoltaic production yields in Jordan, and the need for cost predictability. However, the nature of demand is evolving toward integrated energy solutions that combine solar generation with load optimisation and battery storage.

Looking ahead, the future growth of the sector will depend on targeted regulatory adjustments. Measures that improve the economics of self-consumption, reduce network-related charges, and provide greater flexibility in system operation, particularly in relation to battery storage, could significantly enhance the viability of renewable energy solutions for MSMEs

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1. Introduction

Jordan's energy sector has undergone a significant transformation over the past decade, driven by structural vulnerabilities and strategic policy choices. As a country that historically imported almost all of its energy needs, Jordan has been exposed to price volatility and supply disruptions. This dependency has translated into high electricity tariffs, particularly affecting productive sectors such as manufacturing, food processing, and services.

In response, the government pursued an ambitious renewable energy agenda, positioning solar energy as a cornerstone of its energy transition. The rapid deployment of solar photovoltaic (PV) systems between 2015 and 2020 enabled businesses, especially small and medium-sized enterprises (MSMEs), to reduce operational costs and improve competitiveness.

However, the regulatory landscape has shifted significantly since 2020, with very few approvals granted for new photovoltaic installations. This is clearly reflected in the trajectory of renewable energy in Jordan: between 2014 and 2021, renewable energy grew from less than 1% to around 26% of electricity generation. In contrast, between 2021 and 2024, it increased only marginally from 26% to about 26.9%, despite falling technology costs and improved availability. New policies introduced in 2024 and 2025 have further reshaped the economics and feasibility of solar investments.

This report[1] was developed under the ILO's Innovating in Markets for Inclusive Growth in Jordan (Manzuma) project, funded by RDPP III, which aims to strengthen inclusive and sustainable economic growth and expand access to decent work opportunities for both Jordanians and Syrian refugees. Building on the Market Systems Analyses conducted in the food industry, food services and catering, and chemicals sectors, the report responds to a key cross-cutting constraint identified across all three sectors: the high cost of energy and its impact on MSMEs productivity and competitiveness.

MSMEs for a Just Transition

This report is also situated within the ILO's broader Just Transition agenda, which seeks to support environmentally sustainable economies in ways that are inclusive, resilient, and conducive to decent work creation. In this regard, the ILO's Guidelines for a Just Transition towards Environmentally Sustainable Economies and Societies for All, endorsed by the International Labour Conference, provide an important policy reference and framework for action to ensure that the transition to greener economies supports both enterprise sustainability and social inclusion.

MSMEs are central to this transition. They employ more than two thirds of global workforce and play a critical role in local economic development, yet they are also among the most vulnerable to rising energy costs, climate-related disruptions, and changing regulatory and market conditions linked to the green transition.

In this context, the ILO's Adapt-Mitigate-Thrive (AMT) Framework provides a useful lens for understanding how MSMEs can both adapt to climate and market pressures while contributing to mitigation efforts through greener production and energy practices. The framework recognizes the diversity of MSME realities and supports the development of policies, support systems, and intervention models that help enterprises not only cope with transition pressures, but also "thrive" - improving productivity, strengthening competitiveness, and expanding decent and sustainable employment opportunities.

This report provides a rapid yet operational market scoping of the renewable energy sector in Jordan, focusing specifically on how solar energy solutions can support productivity, cost reduction, and competitiveness among MSMEs in sectors such as chemicals manufacturing, food processing, and food services. The analysis combines regulatory mapping, market assessment, cost structures, and institutional dynamics to provide a grounded understanding of the current landscape and future outlook.

1 This report has been written by Ali Nasrallah (external collaborator) in coordination with Mohammed Alqaisi and Elisa Mandelli (ILO).

2. Evolution of the Renewable Energy Market in Jordan

2.1 Foundation and Growth Phase (2012–2020)

The introduction of the Renewable Energy and Energy Efficiency Law No. 13 of 2012 marked a turning point in Jordan's energy sector. This law enabled private sector participation and introduced key mechanisms such as net metering and wheeling, allowing consumers to generate their own electricity and offset consumption.

During this period, several enabling factors converged:

- Energy supply chain disruption for Jordan, causing a severe energy crisis and very high prices
- Strong political commitment to energy diversification
- International donor support and concessional financing
- Declining global solar technology costs
- Attractive regulatory frameworks for distributed generation

As a result, Jordan experienced one of the fastest renewable energy expansions in the region. Commercial and industrial consumers, including MSMEs, increasingly adopted solar systems as a hedge against rising electricity tariffs.

This period also witnessed the emergence of a robust ecosystem of local engineering, procurement, and construction (EPC) companies, financial intermediaries, and advisory firms.

2.2 Market Saturation and Regulatory Retrenchment (2020–2023)

By 2020, concerns began to emerge regarding:

- Grid stability and absorption capacity
- Financial sustainability of the national utility due to overcommitment to long term energy deals, mainly the contested Israeli gas deal and the very expensive Attarat oil shale project.

These concerns led to a slowdown in project approvals and increasing regulatory caution. Many distributed generation applications were delayed or rejected, creating uncertainty in the market.

This phase marked a shift from a growth-oriented policy approach to a more control-oriented regulatory framework, prioritising system stability, private energy producers guaranteed profits, and utility revenues.

2.3 Current Regulatory Framework (2024–2025)

Recent regulatory reforms have fundamentally reshaped the renewable energy market in Jordan,most notably through the passing of the following two laws and regulations in 2024 and 2025:

- Regulation No. (58) of 2024 on the Regulation of Connecting Renewable Energy Systems to the Electrical Grid and the Exemption of Renewable Energy and Energy Efficiency Systems (نظام تنظيم ربط منشآت مصادر الطاقة المتجددة على النظام الكهربائي وإعفاء نظم مصادر الطاقة المتجددة وترشيد استهلاك الطاقة رقم (58) لسنة 2024)
- The General Electricity Law No. (10) of 2025 (قانون الكهرباء العام رقم (10) لسنة 2025)

The new framework limits the ability of consumers to freely generate, consume, and export electricity. Instead, it introduces tightly regulated connection mechanisms, revised pricing structures, and additional network charges. While these reforms aim to address systemic imbalances, they have also reduced the financial attractiveness of solar investments, especially for MSMEs.

Net metering — a mechanism that allows electricity consumers to offset their energy bills by feeding excess solar power back into the grid — was an effective incentive, and in many ways a subsidy, to kickstart the renewable energy sector in Jordan. However, its cost structure became increasingly generous for customers over time. Under this system, customers with photovoltaic (PV) installations could draw electricity from the grid whenever needed, electricity generated elsewhere and delivered through transmission and distribution networks that incur costs and losses, while exporting their own solar generation at any time regardless of supply and demand conditions, receiving the same tariff. This created an imbalance between the cost of supplying electricity and the compensation provided for distributed generation.

A transition to a new system was therefore necessary to ensure the long-term sustainability of the renewable energy scheme, especially as the sector has matured and PV costs have declined significantly since 2012. Net billing — a system in which electricity consumed from the grid and electricity exported to the grid are calculated and priced separately — is intended to better reflect these cost differences by distinguishing between electricity consumed from the grid and electricity exported. In principle, this aligns pricing more closely with system costs and a sustainable model.

However, the current scheme has its own challenges. It is relatively complex and rigid, offers low compensation rates for exported solar electricity, and does not adequately enable the flexible integration of battery storage. This is particularly problematic for businesses that generate excess electricity during peak sunlight hours but have limited options to store or use it later. In practice, the financial returns under the new system are often less attractive than under net metering, especially for MSMEs with limited capital and shorter investment horizons. As a result, while it improves cost reflectivity for the electricity system, it may also reduce the commercial attractiveness of distributed renewable energy investments and slow down further market uptake.

3. Current Solar Connection Mechanisms and Implications

3.1 New Mechanisms for Photovoltaic Energy connection

The current regulatory framework defines four primary mechanisms for connecting PV systems to the grid. In the Regulation No. (58) of 2024 for Renewable Energy, under Chapter 1 Item 3, renewable energy connections are defined as:

A) Net Billing (On-Site)

Net billing has replaced net metering as the dominant model. Under this mechanism, electricity generated on-site is first used for self-consumption, while excess generation is sold to the grid at a predetermined tariff, lower than the tariff electricity is bought.

The shift from net metering to net billing represents a critical change. Under net metering, businesses and households could feed excess solar electricity into the grid and receive credits at the same tariff they paid for electricity consumption, effectively allowing surplus generation to offset future electricity bills at equal value. In contrast, under net billing, electricity consumed from the grid and electricity exported to the grid are treated separately. Excess solar generation is purchased by the utility at a significantly lower export tariff than the retail tariff paid by consumers for grid electricity:

- **50 fils/kWh for residential users**
- **40 fils/kWh for commercial and industrial users**

This means that self-consumption of solar power becomes much more financially advantageous than exporting surplus electricity . As such, this change reduces the economic value of surplus generation, reducing the overall financial returns for many solar investments.

B) Net Billing (Off-Site / Wheeling)

This mechanism allows electricity generation at a different location from the consumption site. This enables businesses without sufficient rooftop or on-site space to invest in renewable energy installations elsewhere. The generated electricity is transmitted through the national grid to the consumption site, with the utility managing the transfer process. While conceptually attractive, it is constrained by high wheeling fees and electrical losses, highlighted in the table below, which significantly increases costs and limits its practical viability for MSMEs. Businesses must pay wheeling charges for the use of the grid infrastructure, in addition to bearing the impact of technical transmission losses. These additional costs can substantially reduce the financial benefits of the system and lengthen payback periods, making off-site solar investments less attractive for smaller enterprises with limited financial capacity.

Connection Type	Wheeling Charge (fils/kWh)	Electrical Loss (%)
Connection to the transmission system to supply a con-sumer connected to the transmission system	4.5	2.3%
Connection to the distribution system to supply a consumer connected to the distribution system	7	6%
Connection to the transmission system to supply a con-sumer connected to the distribution system	11.5	8.3%
Government Officials	6	6

C) Zero Export Systems

Under this configuration, systems are designed to prevent any export of electricity to the grid. All generated electricity must be consumed on-site in real time, and any surplus production is automatically curtailed or wasted. While this avoids regulatory complications associated with grid-connected export systems, it leads to inefficiencies:

- Excess generation is curtailed, no one benefits from it
- System sizing must be conservative to avoid overproduction, often limiting the overall capacity that could otherwise be installed
- Potential energy savings are lost

As a result, enterprises may not fully maximize their available rooftop space or solar generation potential, leading to lower overall energy savings and reduced economic returns on investment.

D) Export All / Import All

This model separates generation and consumption entirely. All generated electricity is sold to the grid, and all consumption is purchased at retail tariffs. In practice, this means that the solar installation no longer primarily serves to reduce on-site electricity consumption costs, but instead operates more like a standalone investment asset that generates revenue through electricity sales. This effectively transforms solar systems into investment assets rather than cost-saving tools for local energy consumption. Because export tariffs are often lower than retail electricity prices, the financial attractiveness of this model depends heavily on tariff structures, system size, and long-term market conditions. For many MSMEs, it is generally less advantageous than models that prioritize direct self-consumption of solar energy.

3.2 Network Charges and Constraints

Article 9A introduces mandatory network service fees, determined by the Energy and Minerals Regulatory Commission, and highlighted in the table below. These charges apply to most configurations and represent a significant additional cost. It's worth mentioning here that small and medium manufacturing and agriculture are exempt from the wheeling fees.

Further constraints include:

- A cap limiting wheeling renewable systems to covering only up to 50% of consumption (clause 4 C). This restricts businesses from fully meeting their electricity needs through off-site renewable energy systems, reducing potential savings and limiting economies of scale.
- Reduced approved system capacities. Businesses may no longer be authorized to install systems sized to their full technical or operational needs, limiting generation potential and future expansion.
- Utility control over battery systems, even when privately financed. Energy storage systems remain subject to utility oversight and approval processes, reducing operational autonomy for businesses investing in batteries to improve self-consumption and energy management.

These measures collectively reduce flexibility and weaken the business case for solar adoption.

Consumer Category	Network Service Fee (JOD/kW)
Ports	14
Radio and Television	13
Armed Forces	13
Commercial	13
Telecommunications	12
Private Hospitals	12

Consumer Category	Network Service Fee (JOD/kW)
Large Industrial	8
Electric Vehicle Charging	8
Street Lighting	7
Mixed Agriculture	7
Water Pumping	5
Hotels	2.5
Residential	1
Medium Industrial	0
Small Industrial	0
Agricultural	0

4. Market Demand: MSMEs and Energy Needs

Electricity demand amongMSMEs in Jordan is fundamentally shaped by tariff structures, sector-specific energy use patterns, and operational constraints. Together, these factors determine both the level of energy expenditure and the feasibility of renewable energy solutions, particularly solar photovoltaic (PV) systems.

Understanding how tariffs interact with real business operations is therefore essential to assessing market demand for renewable energy in key sectors, including food services, food processing, and manufacturing.

4.1 Structure of Electricity Tariffs

Electricity tariffs in Jordan are structured by consumer category, with distinct pricing mechanisms for commercial users and industrial (manufacturing) users. This distinction is critical, as it creates different cost profiles and investment incentives across MSMEs.

Commercial Tariffs (including Food Services and Catering)

Food services, restaurants, cafés, and catering businesses fall under the commercial tariff category (unless they are inside a hotel), which is based on a fixed block tariff structure:

Commercial Tariff	(fils/kWh)
From 1 – 2,000 kWh per month	120
Above 2,000 kWh per month	152

Given the energy-intensive nature of these businesses, driven by refrigeration, cooking, ventilation, and extended operating hours, most enterprises exceed the 2,000 kWh threshold. As a result, a substantial portion of their electricity consumption is billed at 152 fils/kWh, making

energy a significant and recurring operating cost. For many MSMEs in the sector, electricity costs represent a major and recurring financial burden, directly affecting profitability and competitiveness.

Importantly, commercial consumers are not subject to time-of-use tariffs, meaning that electricity prices remain constant throughout the day regardless of demand patterns.

Industrial Tariffs (Manufacturing and Processing)

Manufacturing and processing enterprises (such as chemical manufacturing and food processing) fall under the industrial tariff category, which is similar to commercial tariffs in case of small industrial tariff with tariffs being determined depending on consumption, but differs structurally from commercial tariffs for medium and large industrial tariffs.

Industrial consumers, particularly medium and large users, are subject to time-of-use (ToU) tariffs, where electricity prices vary by time of day. The structure typically includes:

- **A peak period** with the highest tariffs (evening hours 5:00 pm – 11:00 pm)
- **An off-peak period** with lower tariffs (daytime hours 5:00 am – 2:00 pm)
- **Intermediate peak** periods with moderate pricing (2:00 pm – 5:00 pm & 11:00 pm to 5:00 am)

This system is designed to reflect system demand and incentivise shifting consumption away from peak consumption hours.

For manufacturing MSMEs, however, the ability to respond to these price signals depends heavily on operational flexibility. Continuous production processes, technical constraints, and labour considerations often limit the extent to which loads can be shifted.

Small Industrial Tariff	(fils/kWh)
From 1 – 10,000 kWh per month	60
Above 10,000 kWh per month	68

Medium Industrial Tariff	(fils/kWh)
Peak Period (5:00 pm – 11:00 pm)	79
Partial Peak Period (2:00 pm – 5:00 pm & 11:00 pm to 5:00 am)	69
Off-Peak Period (5:00 am – 2:00 pm)	59

Big Industrial Tariff	(fils/kWh)
Peak Period (5:00 pm – 11:00 pm)	79
Partial Peak Period (2:00 pm – 5:00 pm & 11:00 pm to 5:00 am)	69
Off-Peak Period (5:00 am – 2:00 pm)	59

Implications of Tariff Structures

The divergence between commercial and industrial tariffs leads to distinct cost dynamics:

- **Commercial MSMEs**, including food services, face consistently high and predictable electricity costs, particularly above the 2,000 kWh threshold. This creates sustained

pressure on operating costs and strong incentives to reduce electricity consumption.

- **Small Industrial Tariff** has one of the lowest tariffs with high predictability. As such, smaller manufacturing enterprises benefit from comparatively lower and stable electricity tariffs, which can reduce immediate cost pressures but may also lengthen the financial payback period for renewable energy investments.
- **Industrial MSMEs** face **variable electricity costs**, where the timing of consumption becomes a key factor in overall expenditure. This makesenergy management and shifting production or energy-intensive activities to lower-tariff periods increasingly important for controlling operational expenses.

These differences directly influence how each sector evaluates and adopts renewable energy solutions.

4.2 Sectoral Energy Demand and Operational Profiles

While tariffs define the cost of electricity, actual demand patterns are determined by how businesses operate. Each target sector exhibits distinct energy consumption characteristics that shape its interaction with solar energy.

Food Services and Catering (Commercial MSMEs)

Food services and catering businesses are among the most energy-intensive commercial MSMEs. Their electricity demand is driven by:

- Refrigeration and cold storage
- Electric cooking and food preparation equipment
- Ventilation and air conditioning/heating
- Lighting and long operating hours

Most businesses in this sector operate throughout the day and into the evening, with peak activity often occurring during late afternoon and evening hours.

Because they are billed under the commercial tariff:

- A large share of their consumption is priced at **152 fils/kWh**
- Electricity costs represent a **significant share of operating expenses**

This creates a strong structural incentive to reduce consumption through solar energy. However, since solar generation is limited to daytime hours, it can only offset part of the total load, primarily during preparation and daytime operations, while evening demand remains dependent on grid electricity.

Food Industry (Processing and Manufacturing)

The food processing industry combines characteristics of both commercial and industrial energy use. Key energy demands include:

- Continuous refrigeration and freezing
- Processing and packaging lines
- Hygiene and safety-related systems
- High-consumption thermal processing equipment

Energy consumption is often **continuous or semi-continuous**. Many production processes, refrigeration systems, and food safety operations must run consistently to avoid production interruptions, product spoilage, or quality deterioration. In many cases, equipment such as cooling systems, ovens, pasteurizers, and processing lines must operate according to fixed production schedules, leaving limited flexibility to shift energy use to lower-tariff periods. As a result, food processing enterprises often face sustained and relatively inflexible electricity demand throughout the day.

For facilities classified under industrial tariffs:

- Daytime operations may benefit from **lower off-peak tariffs**
- However, continuous demand reduces the ability to fully optimise costs

Solar energy aligns well with daytime operations, but its impact is constrained by:

- The inability to cover nighttime loads
- Regulatory limits on system sizing and export

Chemicals and Light Manufacturing

The chemicals sector is typically more energy-intensive and technically constrained. Energy is required for:

- Thermal and chemical processes
- Machinery and production lines
- Environmental and safety controls

For this sector:

- Solar energy provides **partial cost reduction during daylight hours**
- However, without storage, it cannot significantly reduce overall energy expenditure

As a result, solar is most effective when combined with:

- Energy efficiency improvements
- Process optimisation
- Load shifting
- Potential future storage solutions

4.3 Implications for Renewable Energy Adoption

The interaction between tariff structures and sectoral demand patterns has important implications for solar adoption among MSMEs.

First, in the commercial sector, solar energy remains a strong cost-reduction tool. By offsetting electricity priced at 152 fils/kWh, solar systems can generate meaningful savings, particularly when designed to maximise self-consumption.

Second, in the industrial sector, the value of solar is more nuanced. Since solar generation coincides with daytime (often lower-cost) electricity, the financial benefit is reduced compared to the commercial case. However, there are still available savings, especially if battery storage is allowed to be used more flexibly to shift load patterns to cover peak hours.

Third, across all sectors, the shift from net metering to net billing further reinforces the importance of self-consumption. Excess generation exported to the grid is compensated at significantly lower rates, reducing overall returns.

Consequently, renewable energy solutions need to be increasingly tailored to the operational profile, tariff exposure, and consumption patterns of each sector in order to remain financially attractive for MSMEs.

4.4 Overall Demand Assessment

Despite regulatory constraints and evolving tariff structures, demand for renewable energy solutions among MSMEs remains structurally strong. This is driven by:

- High electricity costs, particularly for commercial users
- Increasing pressure on businesses to improve efficiency and competitiveness
- The need for greater cost predictability

However, the nature of demand is shifting. Businesses are no longer seeking standalone solar installations, but rather integrated energy solutions that combine:

- Solar generation
- Load management strategies
- Battery storage

This reflects a transition toward a more mature market, where value creation depends not only on technology deployment, but on optimizing energy use within a constrained regulatory and tariff environment.

5. Market Supply, Technology Options, and Business Models

Jordan has developed a relatively mature renewable energy ecosystem, supported by a mix of local engineering firms, regional developers, and specialised service providers. The market includes actors across the full value chain, from system design and installation to financing and operations.

5.1 Supplier Landscape

The supply side is dominated by Engineering, Procurement, and Construction (EPC) contractors, many of which have built strong portfolios during the rapid growth phase of the market. Key players include:

- Ever Green - formally a part of Izzat Marji Group
- JMC Energy
- Ishraq Energy
- Hanania Energy
- Yellow Door Energy
- Kawar Energy - Active in renewable energy project development and energy services on utility scale level
- Philadelphia Solar - A regional manufacturer of photovoltaic panels with both domestic and export markets. It also works as a developer for selected mega projects.

These companies typically provide turnkey solutions, including system design, permitting, installation, and maintenance.

- Rooftop system design and engineering
- Grid connection and regulatory compliance including application for approvals
- Installation and commissioning
- Operations and maintenance

Additionally, some companies offer a financing scheme where the customer has to only pay part of their electricity bill over a certain number of years, offering savings and simplifying the need to find financing through commercial banks.

Under current regulatory conditions, developers have adapted their offerings toward:

- **Optimising system size** to maximize self-consumption
- Designing **zero-export or limited-export systems**
- Providing **hybrid solutions**, where feasible within regulatory constraints

While technical capacity in the market remains strong, the pipeline of new projects is constrained by:

- Approval limitations: More restrictive approval processes and regulatory requirements can delay projects and create uncertainty for businesses seeking to invest in solar energy systems.
- Reduced system sizing: Limits on the approved capacity of solar installations prevent enterprises from fully covering their energy needs or maximizing available rooftop and production space.
- Lower financial returns under net billing: Since excess electricity exported to the grid is compensated at lower tariffs, overall savings and payback periods have become less attractive compared to the previous net metering system.

5.2 Business Models

The market has evolved beyond direct ownership models to include alternative financing structures:

- **Capex model**: The enterprise fully finances and owns the solar system upfront,

benefiting directly from long-term electricity savings and full control over the asset. Although it requires significant upfront investment, this model provides the enterprise with full ownership of the system and allows it to maximize long-term savings while retaining control over maintenance, asset value, and associated financial benefits.

- **Leasing / solar-as-a-service**: A third party finances, installs and owns the system,while the enterprise pays a monthly fixed or variable fee linked to electricity generation. This model reduces upfront investment requirements and can make solar more accessible for MSMEs with limited capital.

Under current regulatory conditions, business models are increasingly designed to:

- Minimise upfront investment: diven limited access to finance for many MSMEs, providers are developing models that reduce initial capital requirements and spread costs over time.
- Optimise self-consumption: since exported electricity is compensated at relatively low rates under net billing, systems are increasingly designed to maximize direct on-site use of solar generation.
- Navigate regulatory constraints: developers and service providers are adapting system configurations and financing structures to comply with evolving regulations, approval requirements, and network service fees.

However, despite the availability of these models, adoption among MSMEs remains constrained by several practical barriers. Awareness and understanding of alternative financing mechanisms are still relatively limited, particularly among smaller enterprises unfamiliar with solar business models beyond direct ownership. In addition, many MSMEs, especially in urban and commercial areas, face physical space constraints, including limited rooftop availability, rented premises, or unsuitable building structures, which restrict their ability to install on-site solar systems even when financially interested.

6. Cost Structures, Financial Viability, and ROI

6.1 Investment Costs

Solar PV system costs for MSMEs in Jordan typically range between **400–700 JOD per kW installed**. This is a big reduction from costs in 2012 when the sector was developing, which could reach up to 1,500 JOD per kW installed.

Costs vary depending on:

- System size and configuration
- Structural requirements, for example rooftops for hanger spaces requires less investment in mounting structure while ground-mounted fixture require higher costs.
- Grid connection and compliance requirements

Key cost components include:

- PV modules and inverters
- Mounting structures
- Engineering and installation
- Permitting and grid integration
- Battery storage if present

6.2 Financial Performance and Payback Periods

Under earlier regulatory frameworks, solar investments in Jordan achieved payback periods of approximately **2–5 years**, driven by favourable net metering conditions, which allowed businesses to offset electricity consumed from the grid with excess solar electricity exported at equal value. As a result, enterprises could significantly reduce electricity bills and recover their initial investment relatively quickly, making solar energy highly attractive from a financial perspective.

Under the current framework, payback periods have extended to **4–8 years**, depending on tariff type, system size, system design.

This shift is driven by:

- Net billing replacing net metering
- Low compensation for exported electricity
- Network service charges
- Limits on system sizing
- Requirement from the electricity company to install extra batteries with the system

7. Institutional and Regulatory Ecosystem

The renewable energy sector in Jordan is governed by a set of key institutions, each with distinct roles:

- **Ministry of Energy and Mineral Resources (MEMR)**: Responsible for national energy policy, strategy development, and sector planning
- **Energy and Minerals Regulatory Commission (EMRC):** Regulates tariffs, licensing, and grid connection rules, and defines applicable charges
- **National Electric Power Company (NEPCO):** Manages electricity transmission and overall system operations
- **Jordan Renewable Energy and Energy Efficiency Fund (JREEF)**: Provides financial support mechanisms, including grants and subsidised financing
- **EDAMA Association**: Represents private sector stakeholders and supports sector coordination

Together, these institutions shape the regulatory and operational environment in which renewable energy solutions are deployed.

8. Key Challenges

Despite the maturity of the sector, several constraints limit further scaling of renewable energy solutions among MSMEs.

A) Regulatory Constraints

- Transition from net metering to net billing reduces financial returns. While the change was necessary, the low costs the utilities are offering to buy back solar energy is a challenge to the financial feasibility.
- High network and wheeling fees increase costs
- Approval processes remain limited and selective
- System capacity approvals are often reduced below requested levels

B) Technical and Operational Constraints

- Grid limitations restrict additional capacity
- Zero-export requirements reduce system efficiency
- Battery systems are subject to utility control, limiting their usability and business case

C) Market and Structural Constraints

- Enterprises operating in rented premises often lack access to rooftops
- Uncertainty in regulations discourages long-term investment
- Financing remains constrained for smaller enterprises

9. Opportunities for Scaling Renewable Energy Solutions

Despite the current regulatory and market constraints, a number of opportunities remain to support the expansion of renewable energy adoption among MSMEs.

First, load optimisation presents a practical and immediately actionable opportunity. By aligning operational activities with periods of solar generation, enterprises can increase self-consumption and improve the financial performance of solar systems under the current net billing regime.

Second, innovative business models, including leasing arrangements and solar-as-a-service, can play a critical role in overcoming upfront investment barriers. These models enable MSMEs to access renewable energy solutions without significant capital expenditure, thereby widening adoption, particularly among smaller enterprises.

Third, battery storage represents an important emerging opportunity, particularly considering decreasing price of batteries and if regulatory conditions evolve. Allowing greater user control over battery systems would enable businesses to store excess solar generation and utilize it during non-solar hours, and be able to use the battery as a backup system is a business advantage that companies would be willing to invest in, especially if they have to invest in backup diesel generators anyway. A more flexible battery storage regulation could significantly enhance system value and addressing current limitations related to evening peak demand.

Finally, targeted regulatory improvements could substantially unlock market potential. Enhancing existing laws and regulations to provide greater flexibility in system operation, reduce network-related charges, and improve the economics of self-consumption would strengthen the business case for renewable energy investments. In particular, adjustments such as reducing network fees and enabling more efficient use of generated electricity could have a direct and immediate impact on project viability.

10. Conclusion

Jordan's renewable energy sector has entered a new phase, transitioning from rapid expansion to a more regulated and constrained operating environment. While earlier policies successfully enabled widespread adoption of solar energy, particularly among commercial and industrial consumers, recent regulatory reforms have fundamentally altered the economics and operational flexibility of renewable energy systems.

The shift from net metering to net billing, combined with network charges, system size limitations, and restrictions on battery use, has reduced the financial attractiveness of solar investments. These changes have had a particularly strong impact on MSMEs, which rely on solar energy primarily as a cost-reduction tool rather than an investment asset.

At the same time, electricity tariff structures continue to play a decisive role in shaping

demand. Commercial enterprises, including food services, remain exposed to relatively high tariffs, creating a continued incentive for solar adoption. In contrast, industrial users, particularly those under time-of-use tariffs or benefiting from lower small industrial tariffs, face a more complex value proposition, where the benefits of solar depend on load profiles and operational flexibility.

Despite these constraints, the underlying drivers of demand remain strong. High electricity costs, competitiveness pressures, and the need for cost predictability continue to push MSMEs toward exploring renewable energy solutions. However, the nature of demand is evolving. Businesses are no longer seeking standalone solar installations, but rather integrated approaches that combine solar generation with load optimisation, energy efficiency, and, where feasible, storage solutions.

Looking ahead, the trajectory of the sector will depend largely on regulatory direction. Incremental adjustments, particularly those that improve self-consumption economics, reduce network-related costs, and provide greater flexibility in system operation, could significantly enhance the viability of renewable energy solutions for MSMEs. In particular, reforms related to battery storage and system utilisation would unlock additional value and better align renewable energy systems with real business needs.

In this context, Jordan's renewable energy market should be understood not as declining, but as restructuring. The new war on Iran which caused an energy crisis globally, and locally stopped the supply of the Israeli gas flowing from the north, will push the government and businesses to shift back to renewable energy deployment. Additionally, the sector, although it was hit for the past years, retains strong technical capacity, an experienced private sector, and sustained demand. With targeted policy refinements, it has the potential to continue contributing to improved productivity, reduced operating costs, and enhanced competitiveness across key MSME sectors, including food services, food processing, and manufacturing.

These shifting market and regulatory dynamics create important opportunities for the ILO to engage with key public and private sector actors around a shared agenda of MSME growth, competitiveness, and sustainable job creation for Jordanians. The evolving renewable energy landscape provides a strategic entry point to facilitate dialogue, coordination, and practical collaboration among enterprises, energy providers, financial actors, business associations, and regulators. By supporting stakeholder engagement around concrete business models, financing approaches, and regulatory solutions, the ILO can help accelerate the uptake of renewable energy among MSMEs while promoting productivity gains, greener enterprise development, and a more inclusive and just transition.

ilo.org

International Labour Organization
Route des Morillons 4
1211 Geneva 22
Switzerland