



**The Role of MSMEs in Fostering Inclusive & Equitable Sustainable Economic Growth**

in the Context of the Clean Energy Transition in MENA

**Jordan  
Qualitative  
Report**

**The Role of MSMEs  
in Fostering Inclusive  
and Equitable Sustainable  
Economic Growth**

in the Context of the Clean Energy Transition in the MENA Region

Jordan Case Study

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*Country Qualitative Reports provide a deeper look into qualitative analysis and narrative of the qualitative survey conducted under the project. To complement the quantitative findings, the project team conducted qualitative surveys, including in-depth interviews with experts and relevant stakeholders, alongside focus group discussions specifically with MSMEs. These qualitative reports offer insights into local challenges, sustainable practices, and employment opportunities, emphasizing inclusivity and gender equity. The qualitative data reports for Egypt, Jordan, Tunisia and Sudan provide a focused perspective on the contributions of MSMEs to an equitable clean energy transition across the MENA region.*

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**August, 2024**

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## ***Key Terms***

<b><i>CBJ</i></b>	<b><i>Central Bank of Jordan</i></b>
<b><i>DISCO</i></b>	<b><i>Distribution Company</i></b>
<b><i>DOS</i></b>	<b><i>Department of Statistics</i></b>
<b><i>EMRC</i></b>	<b><i>Energy and Mining Regulatory Commission</i></b>
<b><i>FDG</i></b>	<b><i>Focus Group Discussion</i></b>
<b><i>IRENA</i></b>	<b><i>International Renewable Energy Agency</i></b>
<b><i>JREEEF</i></b>	<b><i>Jordan Renewable Energy and Energy Efficiency Fund</i></b>
<b><i>MEMR</i></b>	<b><i>Ministry of Energy and Mineral Resources</i></b>
<b><i>MENA</i></b>	<b><i>Middle East and North Africa</i></b>
<b><i>MSME</i></b>	<b><i>Micro, Small, or Medium Enterprise</i></b>
<b><i>NEPCO</i></b>	<b><i>National Electric Power Company</i></b>
<b><i>RE</i></b>	<b><i>Renewable Energy</i></b>
<b><i>SDG</i></b>	<b><i>Sustainable Development Goal</i></b>

## **Acknowledgements**

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## Executive Summary

In Jordan, Micro, Small, or Medium Enterprises (MSMEs) make up over 99% of enterprises and employ around 60% of the workforce, spanning sectors such as Manufacturing, Services, and Trade. These firms, typically with fewer than 100 employees and generating under 1 million Jordanian dinars, face challenges like access to finance, regulatory hurdles, and market competition. Despite these obstacles, MSMEs significantly contribute to Jordan's GDP and employment. International organizations, including the World Bank, have supported reforms to improve the business environment for MSMEs. As Jordan advances in renewable energy (RE) adoption, MSMEs play a crucial role, especially given the country's heavy reliance on energy imports and grid limitations. Decentralized energy production and smart-grid technology offer potential solutions, aligning with the population distribution more effectively than large-scale power plants. This study explores the developmental context of Jordanian MSMEs, focusing on their role in clean energy initiatives, summarizing regulatory frameworks, ongoing projects, and identifying best practices within the broader MENA clean energy transition.

The study aims to develop a comprehensive framework for enhancing the involvement of MSMEs in Jordan's RE transition, exploring their relationship with the economic and policy environment, identifying challenges and opportunities, and contributing to the Sustainable Development Goals (SDGs). Specific objectives include assessing the role of MSMEs in the clean energy transition, analyzing the impact of energy policies on MSMEs and economic growth, evaluating sectoral implications, particularly regarding gender equality (SDG 5) and decent work (SDG 8), and providing decision-makers with data-driven insights to inform policy formulation and revision to support MSMEs in the energy transition.

The study employs a qualitative approach to examine the role of MSMEs in the clean energy transition and their contribution to sustainable economic growth. The qualitative research tools include Focus Group Discussions, Key Informant Interviews, and a desk review, engaging multiple stakeholder groups to provide deeper insights and contextualize findings. Data gathered from these methods were analyzed to assess the current state of MSMEs in the clean energy sector, identify gaps and opportunities, and recommend strategies for enhancing their role in sustainable economic growth, ensuring the study's outcomes are robust and actionable for decision-makers.

Jordan is transitioning from fossil fuels to RE, crucial for addressing its economic, environmental, and security challenges. This shift is particularly significant for MSMEs, which can benefit from cost savings and increased competitiveness despite facing new taxes and regulatory challenges. Key hurdles include bureaucratic, financial, and infrastructural constraints, emphasizing the need for innovative government policies and MSME responsiveness. Success stories and evolving awareness are encouraging more MSMEs to adopt RE for environmental and competitive reasons, potentially leading to job creation and skill development in the RE sector.

The study's recommendations focus on enhancing the RE transition for MSMEs through several key areas: improving RE financing by attracting investment and exploring innovative models; refining policy frameworks and regulations to ease adoption and offer incentives; investing in capacity building and raising public awareness; implementing monitoring and adaptation measures to track progress and enhance resilience; upgrading infrastructure to support RE integration; and developing sector-specific strategies tailored to different energy demands, including targeted measures for MSMEs to build awareness and capacity for energy transition.

# CHAPTER ONE: Introduction, Methodology, and Context

## Introduction

In Jordan, MSMEs constitute most of the enterprises and employ the majority of the workforce. MSMEs represent more than (99%) of the total number of enterprises in Jordan and employ approximately (60%) of the workforce.<sup>1</sup> These enterprises operate across various sectors, including Manufacturing, Services, and Trade, playing a vital role in the economic fabric of the Kingdom. In the Jordanian context, MSMEs are generally firms that employ less than 100 employees and generate less than 1 million Jordanian dinars (JOD).<sup>2</sup>

MSMEs in Jordan face several challenges, including access to finance, regulatory hurdles, market competition, weak inter-enterprise coordination and weak linkages with large firms. Despite these obstacles, they continue to contribute significantly to the GDP and employment. The World Bank and other international organizations have supported Jordan in implementing reforms to enhance the business environment for MSMEs, focusing on improving access to finance and reducing regulatory burdens.<sup>3</sup>

Towards the clean energy transition in MENA, Jordanian MSMEs have an important role to play. Jordan has made great strides in the past decade in sourcing more energy from RE sources. Unfortunately, large-scale RE projects in the Kingdom are limited as the electrical grid has issues with capacity and efficiency to absorb and transmit the generated RE in various areas in Jordan. It is worth mentioning that Jordan imports almost (93%) of its energy requirements from abroad; hence the country is vulnerable to price changes in addition to concerns over national energy security.

With the largest single share of electricity used by residential consumers, there is potential for decentralized energy production and storage to aid with the green energy transition in Jordan. Paired with smart-grid technology, RE production can reduce reliance on a national grid for the production, storage, and long-distance transportation of energy.<sup>4</sup> MSMEs represent nodal concentrations of capital distributed across every part of the Kingdom. Their distribution better mirrors the population distribution than large-scale power plants.

This study examines the developmental context of MSMEs in Jordan with a special emphasis on the synergy context of clean energy initiatives. It will summarize current regulatory frameworks, ongoing initiatives, and proposed projects for developing these two segments of the economy. It

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<sup>1</sup> JCI, "Small and Medium Sized Services," 2024. <https://jci.org.io/Chamber/Services/Sectors/80095?l=en>

<sup>2</sup> Department of Statistics of Jordan. Establishments Census 2018. <http://dosweb.dos.gov.jo/censuses/establishment-census>

<sup>3</sup> The World Bank. "Jordan Economic Update, Spring 2020." (Information based on general knowledge and available literature).

<sup>4</sup> MoEnv. "Energy Sector Green Growth National Action Plan 2021-2025," 2020

will identify best practices and compatibilities. Furthermore, the findings will be contextualized within the greater MENA clean energy transition.

## **The Study Objectives**

The study aims to provide a comprehensive framework for understanding and enhancing the involvement of MSMEs in Jordan's renewable energy transition. As well as seeks to explore the relationship between MSMEs and the broader economic and policy environment, identify the specific challenges and opportunities presented by the transition to sustainable energy, and contribute to the achievement of the UN SDGs. Furthermore, these objectives are designed to equip decision-makers with data-driven insights for the formulation and revision of policies that nurture the MSME ecosystem within the context of Jordan's energy transition. More specifically, the study aims to achieve the following:

- Assessment of the role of MSMEs in the clean energy transition.
- Analysis of the impact of energy policies on MSMEs and economic growth.
- Assessment of challenges and opportunities of the clean energy transition in Jordan.
- Evaluation of sectoral implications and contribution towards achieving SDGs. Especially goals 5 and 8, concern gender equality and Decent work.
- Support decision-makers with evidence to create and amend existing policies, regulations and strategies to foster the MSME role in the energy transition.

## **Methodology**

The methodology for this study employs a comprehensive qualitative approach, to explore the role of MSMEs in the RE transition and their contribution to promoting inclusive and equitable sustainable economic growth. This expanded methodology aims to capture a broad and nuanced understanding of the dynamics at play, leveraging detailed data collection and analysis to meet the study's objectives.

**Qualitative Tools:** The qualitative tools include Focus Group Discussions (FGDs), Key Informant Interviews (KIIs), and a desk review. These tools are employed to gain deeper insights into the experiences, perceptions, and aspirations of stakeholders involved in or affected by the clean energy transition. The qualitative research is crucial for exploring more nuanced themes that a surveys cannot fully address. A diverse group of 35 participants were engaged in the in-depth interviews (KIIs), in addition to five FGD sessions, representing a cross-section of stakeholders directly and indirectly involved in the clean energy transition:

The sample of the study includes a wide range of individuals and enterprises concerned with the scope of the study: MSMEs with varied experiences regarding the energy transition, environmental consultants, research scientists specializing in environmental studies, government officials from relevant ministries and agencies, managers from banks, financial, and microfinance

institutions, national and International energy sector experts, and representatives of environmental associations/NGOs. Additionally, RE installation companies and affiliates were included: A company engaged in the energy transition, an RE solutions provider, an environmental association representative, a regional energy directorate representative, and local government officials with positions related to the governance of RE installation.

## Data Gathering and Analysis

The comprehensive data gathering facilitated by the qualitative research tools will be analyzed to provide insights into the current state of MSMEs in the clean energy transition, identify gaps and opportunities for policy intervention, and recommend strategies to enhance MSMEs' contribution to sustainable economic growth. The qualitative approach is designed to ensure that the study's outcomes are robust, relevant, and actionable for decision-makers aiming to foster a supportive environment for MSMEs within the context of Jordan's energy transition.

### Key Informative Interview

Phenix Center conducted 35 semi-structured interviews with directors, business owners, managers, and other experts to explore the role of SMEs in promoting and utilizing renewable and green energy. The sample aimed to be as representative of the Jordanian economy as possible. The interviews were expected to last between 30 and 40 minutes. Interviews were conducted either in person or online (via telephone and Zoom), depending on the interviewee's preference.

**Table 1: Distribution of participants in KIIs**

Group No.	Participants	#	%
1	Representatives of small and medium enterprises	7	20%
2	Researchers and other technical experts in the energy field	6	17%
3	Local policy experts in the field of energy transformation	5	14%
4	Jordanian government	7	20%
5	Banking and Finance institution	4	12%
6	Private Sector	6	17%

### Focus Group Discussions

In collaboration with the Chambers of Commerce and Industry, Phenix Centre identified representatives from SMEs. The selection considered the diversity of company sizes, geographic location, and whether the companies are women-owned. (8–10) participants in each focus group discussion were chosen based on their experiences transitioning to green energy. Phenix Center conducted five focus groups across various regions of Jordan, these participants will include representatives of small and medium-sized enterprises (SMEs), companies already using clean

energy, companies involved in the installation of renewable energy tools, representatives from environmental associations and other relevant civil society organizations, government representatives.

**Table 2: FGD locations and participants**

No.	Governorate	Place	Participants
1	Amman	Geneva Hotel	Representatives of SMEs, Companies already using clean energy, Companies involved in the installation of renewable energy tools, Government representatives
2	Amman	Nashmiyat Al-Dajjah Charitable Association	Representatives of SMEs, Companies already using clean energy, Companies involved in the installation of renewable energy tools
3	Zarqa	Al-hikma Association	Representatives of SMEs, Companies already using clean energy, Companies involved in the installation of renewable energy tools
4	Irbid	Aman Association for Local Community Development	Representatives of SMEs, Companies already using clean energy, Companies involved in the installation of renewable energy tools
5	Ma'an	Ma'an Chamber of Commerce	Representatives of SMEs, Companies already using clean energy, Companies involved in the installation of renewable energy tools, Government representatives

The comprehensive data gathering facilitated by the qualitative tools was analyzed to provide insights into the current state of MSMEs in the RE transition, identify gaps and opportunities for policy intervention, and recommend strategies to enhance MSMEs' contribution to sustainable economic growth. This methodology, with its qualitative approach and its intersectional focus, was designed to ensure that the study's outcomes are robust, relevant, and actionable for decision-makers aiming to foster a supportive environment for MSMEs within the context of Jordan's energy transition.

Jordan has specific standards for designating whether a firm is Micro, Small, or Medium, depending on the sector. These designations are used for identifying the type of business eligibility for different financial, legal or development services.

**Table 3: Registering and formalizing an MSME is done with the following categorization standards sorted by sector Industry (I), Services (S), and Trade (T):<sup>5</sup>**

	I Micro	I Small	I Med.	S Micro	S Small	S Med.	T Micro	T Small	T Med.
Employees	<5	<20	<100	<5	<25	<50	<5	<10	<50
Revenue (JOD)	<100,000	<1 mil	<3 mil	<200,000	<500,000	<1 mil	<120,000	<150,000	<1 mil

<sup>5</sup> ARDD, "Identifying and overcoming obstacles to the creation of MSMEs in Jordan," 2023.

The registration and formalization of enterprises in the Jordanian legal system use different standards for defining the enterprise's required documents and fees for registration, as well as its liability, capital requirements, and structure. Since there are codified definitions of each subclass of MSMEs, samples will be taken with representation from each group.

## **Renewable Energy Landscape in Jordan**

Jordan has set ambitious targets to increase the share of RE in its total energy mix. Growing the use of RE from less than (1%) in 2014 to (21%) by 2021, aiming to achieve (31%) by 2030, the Kingdom is on track to become much more energy and environmentally sustainable.<sup>6</sup> The Jordanian government has implemented various policies and initiatives to attract investments in RE projects. The Ministry of Energy and Mineral Resources' (MEMR's), 2012: Renewable Energy and Energy Efficiency Law No. 13, provides a favorable regulatory framework, offering financial incentives, tax breaks, and guarantees for RE investors.<sup>7</sup>

Solar and wind energy dominate the RE sector in Jordan. Large-scale projects, such as the Ma'an Solar Park and the Tafila Wind Farm, have contributed significantly to the country's RE capacity. Other RE technologies are still being considered but have yet to be adopted on a significant scale. With the exception of one biomass anaerobic decomposition facility, there are not any current projects for other RE sources such as hydrogen or geothermal. However, the involvement of MSMEs is essential for achieving a more decentralized and inclusive energy transition.

## **The Role of MSMEs in Renewable Energy Development**

MSMEs are instrumental in fostering innovation, driving competition, and ensuring the widespread adoption of RE technologies. In Jordan, MSMEs are actively participating in various aspects of the RE value chain, from installation to maintenance to efficiency retrofitting services. New standards for construction will require MSME construction firms to learn new energy-efficient practices and increase awareness of energy efficiency incorporated into infrastructure. Retrofitting older structures will enhance this awareness and create job opportunities. MSME involvement is not only contributing to the achievement of national RE targets but also enhancing economic development and dissemination of RE practices.

Additionally, taking on the role of prosumers (small-scale energy producers and providers of storage) MSMEs have the opportunity to aid in national development while cutting costs and their carbon footprint in the long run.<sup>8</sup> Through the implementation of a smart grid even individual residences' water heaters can store energy during peak energy production and rooftop solar panels can feed electricity back into the local grid with higher efficiency than energy transmitted from further away sources. For the nighttime, energy can be stored by pumping

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<sup>6</sup> IRENA, "The Hashemite Kingdom of Jordan Renewable Readiness Assessment" p.4, 2021

<sup>7</sup> ESCWA, Case Study on Policy Reforms to Promote Renewable Energy Jordan, p.59, 2018

<sup>8</sup> IRENA, "The Hashemite Kingdom of Jordan Renewable Readiness Assessment" p.64, 2021

water to a higher elevation and allowing gravity-fed turbines to generate electricity in the evening or for use in gravity-fed municipal water systems. Wind power can also complement solar power by generating electricity at night. These small providers can then efficiently contribute to high energy consumption processes without wasting energy production during peak output.

**Table 4: Domestic electricity consumption breakdown according to the Jordan Department of Statistics:<sup>1</sup>**

Usage	2022 <sup>1</sup>		2021	
	Percentage of Total	Giga Watt/ Hour	Percentage of Total	Giga Watt/ Hour
Household	47.9	9,862.6	48.1	9296.4
Industrial	21.2	4370.1	21.0	4,048.0
Commercial	14.7	3019.3	14.5	2808.9
Water Pumping	14.2	2916.9	14.3	2769.4
Street Illumination	2.0	408.2	2.0	388.6
Total	100.0	20,577.1	100.00	19,311.3

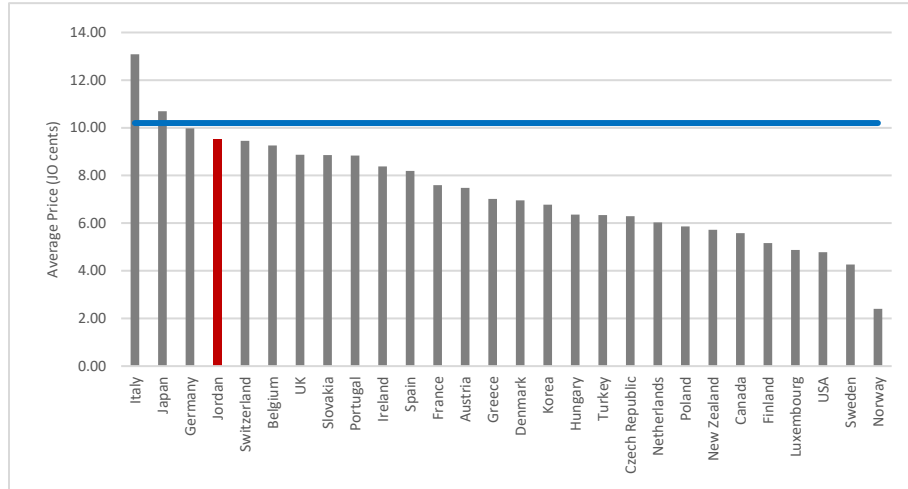
*The table shows how electricity is used. 14.2% of energy is used for water pumping, which can be done almost entirely during peak electricity generation into water towers and roof storage units to lower energy demand in the low-output hours. Water pumping during peak generation into points at higher elevation from use is an instance of connected storage of energy. Source: DOS Annual Report*

Sustainable development in Jordan requires supporting the majority of the workforce that is represented in MSMEs. In terms of equity of access to the clean energy transition, and with the current constraints on the electrical grid and capacity for domestic energy production, there is a need for more dispersed energy production. By investing in MSMEs as nodes of RE production and storage Jordanian policymakers can empower lower-income individuals, while increasing equity of affordable energy access, and bypassing some infrastructure constraints.

### **Challenges Faced by MSMEs**

Jordan's industry-standard electricity tariff rate is high compared to the benchmark (this includes mining, large industries, and MSMEs) but it reflects adverse implications regarding competition especially if we compare it to neighboring countries abundant with cheap energy resources.

### Infographic 1: Average price of energy sorted by country.



Despite their vital role, MSMEs in the RE sector in Jordan encounter several other challenges. Access to finance remains a significant hurdle, as securing funding for RE projects can be difficult due to perceived risks and the capital-intensive nature of the industry. There are also opportunities from grant funds like the Innovative Startups Fund Project in Jordan, which has been designed to provide early-stage financing for startups across several sectors, including RE.<sup>9</sup>

MSMEs in Jordan are close to the small size; most of the enterprises do not have proper bookkeeping and some of them are working informally. As such providing collateral that ensures access to cheap funding is not an easy task. Most of the owners provide personal guarantees to secure funding which complicates the matter further. Hence, owners take on unlimited liability for financial responsibilities if they do not have 20,000 JOD or more in start-up capital (as opposed to limited liability for most larger institutions), and access to a lawyer’s services.<sup>10</sup> Should an unlimited liability business default on debts the owner(s) will be obligated to use personal assets to cover the losses.

These conditions create a high barrier to entry for starting a new business or formalizing a business that has been operating in the informal domain. Over (62%) of Jordanians would not start a business for fear of it failing.<sup>11</sup> These fears are particularly inhibiting in the younger generations’ attempts to enter the market. “A majority of youth trying to open a business (up to 51%) in Jordan fail to start it and (42 %) started but failed to sustain it.”<sup>12</sup>

Limited technical expertise and insufficient human resources also pose challenges for MSMEs, hindering their ability to compete with larger, more established players. Furthermore, the

<sup>9</sup> IRENA, “The Hashemite Kingdom of Jordan Renewable Readiness Assessment” p.52, 2021

<sup>10</sup> ARDD, “Identifying and overcoming obstacles to the creation of MSMEs in Jordan,” 2023.

<sup>11</sup> the Global Entrepreneurship Monitor/Jordan National Report 2019/2020

<sup>12</sup> ARDD, “Identifying and overcoming obstacles to the creation of MSMEs in Jordan,” 2023.

bureaucratic hurdles in obtaining permits and navigating regulatory processes can be time-consuming and resource-intensive for MSMEs. The lack of a standardized framework for connecting RE projects to the grid adds a layer of complexity, discouraging potential participation and hindering the scalability of MSME-led initiatives.

## **Role of MSMEs in Economy and Society**

MSMEs are essential to fostering economic growth, employment generation, and innovation in Jordan. They are nimble and adaptable, often more so than larger enterprises, enabling them to innovate and respond to market changes rapidly. This agility is crucial for the development of new products and services, including those related to clean energy and sustainability.

The potential impact of MSMEs on the energy transition cannot be understated. As Jordan and other MENA countries aim to diversify their energy sources and increase energy efficiency, MSMEs are at the forefront of developing innovative solutions. These range from RE technologies to energy efficiency improvements in buildings and industrial processes. By investing in clean energy solutions, MSMEs not only contribute to reducing carbon emissions but also can adapt to new market opportunities and create jobs in emerging sectors.

## **Government Commitments to MSME's**

The government of Jordan has made commitments to increase the share of RE in its total energy mix, aiming for a more sustainable and secure energy future. This transition offers a significant opportunity for MSMEs to contribute to and benefit from the growing RE sector.<sup>13</sup> Beyond the commitment, there are many policy tools they can utilize to expedite Jordan's transition.

Thus, the government is and will continue to play a crucial role in promoting inclusive and equitable sustainable economic growth as part of the clean energy transition. By developing and implementing innovative clean energy solutions, MSMEs can help reduce energy costs, improve energy security, and make energy access more equitable. The government will be able to meet green energy targets set out in the Economic Modernization Vision and the UN SDGs by subsidizing financial support for green tech implementation. Such as, with the aid of smart-grid technology, which can optimize the distribution and storage of energy from micro and large-scale producers.

## **Overview of Relevant Stakeholders**

The landscape of stakeholders involved in the energy transition within Jordan and the broader MENA region is diverse, encompassing a range of entities from governmental authorities to private sector participants and the public. These stakeholders each play a unique and critical role

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<sup>13</sup> International Renewable Energy Agency (IRENA). "Renewable Energy Market Analysis: MENA Region 2020." (Information based on general knowledge and available literature).

in advancing the shift towards RE sources, thereby contributing to the region's sustainable development goals.

- **Governmental and Regulatory Authorities**

At the helm of the energy transition are the governmental and regulatory authorities, including the Ministries of Energy, Environment, and Finance. In addition to the Energy and Mining Regulatory Commission (EMRC). These agencies are guided by the goals of the Jordan Economic Modernization Vision and the UN SDGs.

These entities are instrumental in devising, implementing, and overseeing energy policies and regulations. Their responsibilities extend to setting RE targets, formulating incentives for clean energy investments, and establishing frameworks that govern the Energy sector's operation within Jordan.<sup>14</sup> The successful transition towards RE in Jordan hinges on the collaborative efforts of a diverse set of stakeholders. From governmental authorities formulating policies to energy providers driving technological innovation, and consumers adopting sustainable practices, each plays a pivotal role in shaping the region's energy future.

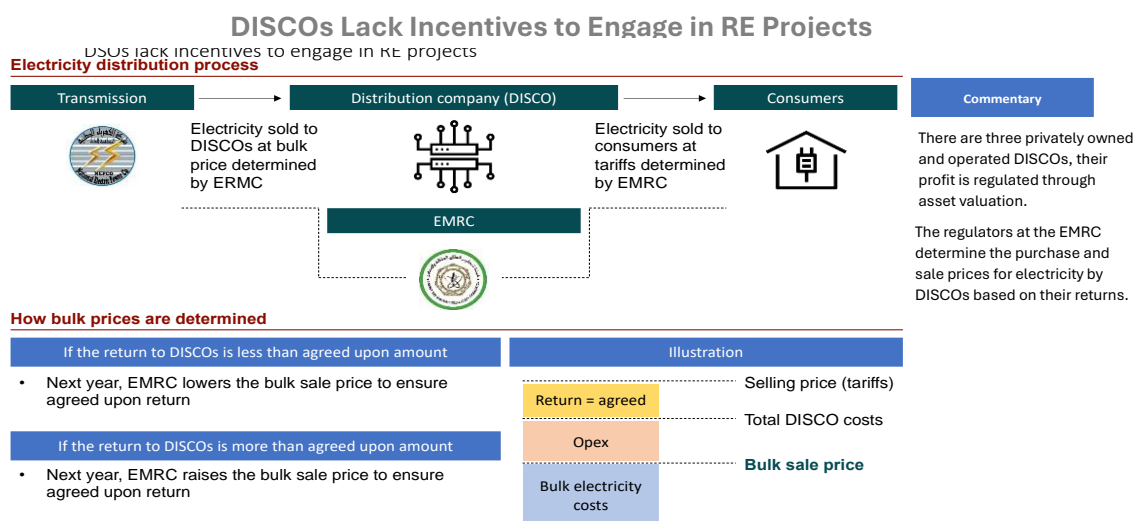
- **Generations Transmission and Distribution Companies**

Jordan adopts a single-buyer model through which the National Electrical Company (NEPCO) buys the electricity from the producers based on long-term contractual arrangements. Those producers are either independent private investors or publicly owned by the state, such as SAMRA which produces about (33%) of the generated electricity. In return, NEPCO sells bulk electricity to the three electricity distribution companies (DISCOs) which take responsibility for connecting to end users in residential, commercial or industrial settings. The price at which the DISCOs sell is set by the regulator (EMRC). The price is the sum of NEPCO's sale price, and a guaranteed return on assets according to EMRC's formula. The graph below exhibits the landscape and the main players in the market. Neither NEPCO nor the DISCOs have incentives to introduce RE into the system since NEPCO already has long-term arrangements with producers and DISCOs, which are privately owned, have their return on assets guaranteed. This would partly explain the cumbersome procedures that these companies have implemented for inclusion of intermittent RE systems.

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<sup>14</sup> United Nations Economic and Social Commission for Western Asia (ESCWA), "Energy Policies and Regulations in the MENA Region, 2015".

## Infographic 2:<sup>15</sup> DISCOs' electricity pricing and distribution process.<sup>16</sup>



### • The End Users

The transition to RE is not solely a technical or financial challenge but also a societal one, where the acceptance and adoption of RE technologies by consumers are paramount. This group encompasses a wide array of stakeholders, from individual households to large industrial users, each contributing to the demand side of the energy equation. Consumer behaviour, including the willingness to adopt RE solutions and invest in energy-efficient appliances, plays a vital role in determining the pace and success of the energy transition. Engaging consumers through awareness campaigns, incentives, and education is essential to foster a culture that supports sustainable energy practices.<sup>17</sup>

## The Market Operations

Jordan adopts two modalities to permit RE projects. The first one is net metering where consumers can produce and transmit to the grid and at the end of each period a settlement between the two parties takes place. The settlement depends on the tariff that the consumers pay for their consumption. Normally households or small enterprises use their rooftop for such a model. The second one is the feed-in tariff, under this modality pre-agreed-upon tariff for the electricity will be paid for generation from various RE technologies. NEPCO is obliged to compensate producers which are normally large enterprises that normally generate electricity away from where it is being used. They have to use the national grid for transmission. Both of these modalities require several approvals from several authorities which are normally

<sup>15</sup> Developed by Dr. Ibrahim Saif

<sup>16</sup> OPEX: Operational expenses and DISCO: electricity distribution companies

<sup>17</sup> Energy Transition in the Middle East and North Africa: The Road to COP28, Briefing 30 November 2023, Hanan Keskes Laury Haytayan. Where is it published or sourced?

overlapping and can be delayed due to bureaucratic and technical reasons concerning mainly grid and transformer capacity. These difficulties can create barriers to entry that deter new entrepreneurial ventures. These frameworks need to remain accessible for new businesses to increase the dynamism of the MSME firms in transitioning into emerging sectors, like RE production and storage.

## Jordan's Energy Security Concerns

Jordan's energy security is a pressing concern, given its limited conventional energy resources. The country's reliance on energy imports, which comprises 93% of its needs, subjects it to the whims of international markets and the political instability of suppliers. This vulnerability underscores the importance of developing a robust, sustainable, and self-reliant Energy sector through the adoption of RE technologies. Such a strategic pivot not only ensures Jordan's energy security but also addresses long-term environmental sustainability goals.<sup>18</sup> The Industrial sector faces the dual challenge of enhancing energy efficiency while ensuring its operations and sustainability. Overcoming these obstacles is essential for Jordan's economic resilience and environmental stewardship.

## Policy Framework and International Commitments

Jordan's commitment to the clean energy transition is anchored in a solid policy framework and bolstered by its participation in international agreements and regional initiatives aimed at climate change mitigation and sustainable development:

- **Paris Agreement:** Jordan's ratification of the Paris Agreement illustrates its dedication to reducing greenhouse gas emissions and collaborating on global climate action efforts.<sup>19</sup>
- **Sustainable Development Goals (SDGs):** The United Nations' SDGs, particularly Goal 7 (Affordable and Clean Energy) and Goal 13 (Climate Action), guide Jordan's national strategies for sustainable development and clean energy adoption.<sup>20</sup>
- **IRENA Membership:** As a member of the International Renewable Energy Agency (IRENA), Jordan aligns itself with international best practices and standards in RE development and deployment.

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<sup>18</sup> *ibid.*

<sup>19</sup> United Nations Framework Convention on Climate Change (UNFCCC), "Paris Agreement – 2015.

<sup>20</sup> United Nations in Jordan, "Sustainable Development Goals."

<https://jordan.un.org/en/sdgs#:~:text=The%20UNSDf%20commits%20the%20UN,%2C%20transparent%20and%20resilient%3B%202>

- **Regional Initiatives:** Participation in regional energy initiatives enhances Jordan's collaboration with neighboring countries to ensure energy security and sustainability across the MENA region.<sup>21</sup>

These frameworks and commitments reflect Jordan's stance on energy transition, underscoring the country's resolve to embrace RE for sustainable development. Jordan's energy transition is a strategic imperative aimed at reducing reliance on fossil fuels, enhancing energy security, and promoting environmental sustainability.

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<sup>21</sup> Regional Center for Renewable Energy and Energy Efficiency (RCREEE), "Arab Future Energy Index (AFEX) Renewable Energy 2020." This index evaluates renewable energy development and policy frameworks in the Arab region, including Jordan's participation in regional energy initiatives.

## CHAPTER TWO: Impact of Public Policies on MSMEs in the Energy Transition

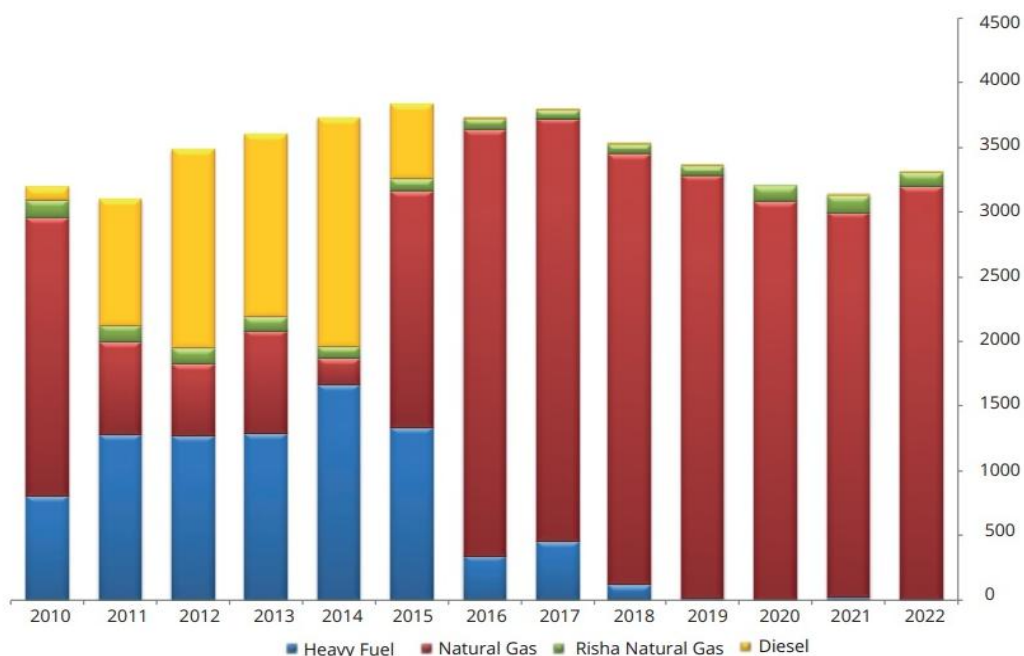
### Introduction

The energy landscape in Jordan is undergoing a significant transformation as the country endeavors to reduce its dependence on fossil fuels and embrace cleaner and more sustainable alternatives. This transition presents both challenges and opportunities for MSMEs operating within the Energy sector.

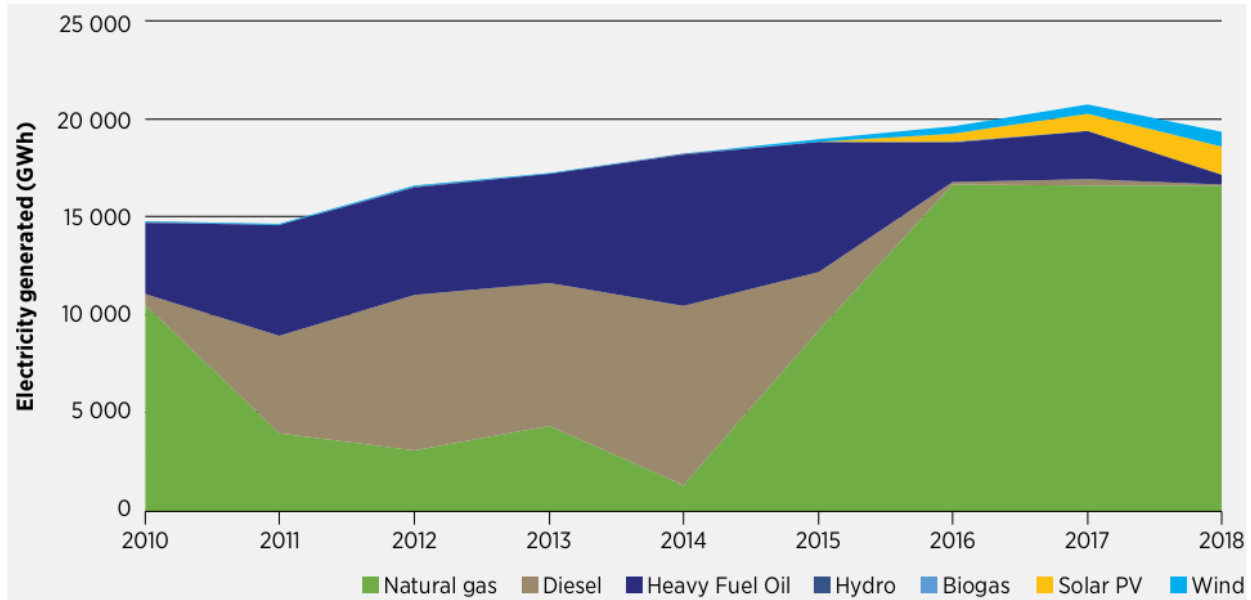
Generally, two major shifts can be observed in energy generation in Jordan; the first one is the shift from oil to gas and the second is the increasing contribution of renewables in the energy mix since the year 2014. This can be attributed to major policy changes that took place; the introduction of the renewable energy law in 2012 and the initiatives and commitments by the government aiming at enhancing energy security and increasing the efficiency of the sector by reducing the cost of generation. Moreover; reducing reliance on fossil fuels has been useful in meeting Jordan's commitment to reduce carbon emissions and other environmental KPIs in several protocols and agreements that the government has endorsed.

### Infographic 3 and 4: Non-renewable fuel consumption for electricity generation and electricity generation by source

**Fuel Consumption for Electricity Generation (T.T.O.E)**



Source: National Electric Power Company (NEPCO), Annual Report, 2022



Source: NEPCO and IRENA<sup>22</sup>

## Finance Opportunities and Challenges

How has Jordan facilitated the energy transition by using financial incentives to gain commitment from the private sector? The banking system in Jordan has been offering some special access to credit for enterprises (Green Finance) that are willing to make the transition.<sup>23</sup> The Ministry of Energy and Mineral Resources (MEMR) created the Jordan Renewable Energy & Energy Efficiency Fund (JREEEF), which has conducted energy audits for MSMEs and helped secure funding sources for some of these enterprises. JREEF’s services have proven to be a success story in terms of motivating these enterprises to engage in energy transition.<sup>24</sup> However, according to the interviews conducted these efforts have been short of meeting the demand by MSMEs due to the up-front capital requirements in these capital-intensive projects and the lack of desire in the banking system to extend finance for MSMEs beyond certain programs supported by the Central Bank of Jordan (CBJ).

<sup>22</sup> IRENA, “Renewable Readiness Assessment: The Hashemite Kingdom of Jordan,” 2021.

<sup>23</sup> CBJ Jordan, “Green Finance Strategy,” p. 10, 2023.

<sup>24</sup> Jordan Renewable Energy and Energy Efficiency Fund - JREEEF-support targets small and medium-sized factories and 3-star hotels or lower, JREEEF aims to increase competitiveness by reducing energy costs. This not only helps businesses to improve their services and potentially hire new staff but also contributes to their ability to reinvest savings in their facilities. The focus on enhancing services and environmental sustainability, demonstrates a holistic approach to sustainable development, going beyond mere energy savings.

The energy transition requires upfront investments; and technical support beyond what the state has offered. While some state support exists for technological upgrades and expansion, it often falls short of covering costs or incentivizing a speedy shift towards sustainable practices/sources. The need for RE technology adoption grows by the year while the price of solar panels has dropped by over 90% in the last decade.<sup>25</sup> Between 2010 and 2017 wind power prices fell by 23%.<sup>26</sup> The technology has never been more accessible, and with financial support from the government can begin rapid assimilation with MSMEs.

Access to capital and state support for adopting new technologies remains crucial for MSMEs to grow and engage in larger projects. Although the market for RE and sustainable practices is maturing, with an increasing number of companies entering this space, there's a noticeable deficiency of manufacturing companies and a need for more competition based on quality and adherence to international standards.

## **Barriers and Incentives for MSMEs' Participation in Clean Energy Initiatives**

### **Regulations and Institutions**

In 2012 Jordan adopted the Renewable Energy and Energy Efficiency Law (REEL) which has granted investors tax incentives and exemptions to invest in the transition.<sup>27</sup> However, the bylaws after issuing that law have been subject to unfavorable amendments such that of the introduction of fees on RE systems, complicating the landscape for MSMEs. The economic constraints faced by potential clean energy initiative participants, who recognize the benefits of RE but are deterred by installation costs, present a fundamental barrier. Furthermore, disparities in standards across regions and among energy companies in Jordan add to the compliance burden and impact the success rate of projects. Such barriers not only impede the adoption and implementation of RE projects by MSMEs but also hinder the broader national goals of sustainable development and energy independence.

Complex approval processes involving multiple entities and overlapping responsibilities contribute to confusion, delays, and inefficiencies.<sup>28</sup> Moreover, insufficient coordination among relevant authorities, such as municipalities and electric companies, exacerbates these challenges, leading to significant transactional delays. Despite these barriers, the period between 2016 and 2018 is highlighted as a golden era for solar energy adoption in Jordan, offering valuable insights into how MSME engagement in RE projects can be improved. The lack of governmental financial support and high upfront installation costs are identified as significant deterrents for MSMEs,

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<sup>25</sup>Cuthbertson, "Fossil fuels 'becoming obsolete' as solar panel prices plummet," 2023

<sup>26</sup> Gielen, et al. "The role of renewable energy in the global energy transformation," 2019.

<sup>27</sup> ESCWA, "Case Study on Policy Reforms to Promote Renewable Energy Jordan," p.5, 2018

<sup>28</sup> ESCWA, "Case Study on Policy Reforms to Promote Renewable Energy in Jordan," p.49, 2018

notwithstanding the promising economic benefits and quick payback periods observed in the Commercial sector. Policy incoherence, additional fees on RE systems, and logistical restrictions in designated development areas further impede the adoption and expansion of solar energy projects. Innovative financing models, such as the Purchase Power Agreement (PPA), are recognized for their potential to overcome financial barriers, yet their application remains limited, primarily to government projects, due to security of payment concerns. This limitation underscores the need for broader financing options to facilitate MSMEs' access to RE solutions. Also, the lack of coordination and communication among relevant authorities, such as municipalities and electric companies, exacerbates the difficulty in processing transactions and obtaining necessary approvals, leading to significant time delays.

There's an alarming anticipation of reduced emphasis on RE, stemming from deteriorating trust between electricity companies and citizens. The introduction of taxes, fees, and restrictive measures like capacity limits on transformers and bureaucratic hurdles in obtaining RE approvals, could severely hamper the RE sector's expansion, affecting MSMEs' competitiveness and sustainability.

## **Technologies and Technical Capacity Building**

Jordan has not restricted the type of technology to be used and it was left to the developers and enterprises to determine what is best for them. Jordan has tried to upgrade the grid capacity to absorb the new RE projects. The investment in the “green corridor” projects which was procured by NEPCO to enhance the transmission capacity of the grid which was not adequate.

The analysis of stakeholder insights from Jordan's Energy sector underscores the importance of grid and infrastructure improvements, the gap in specialized technical knowledge and expertise, the need for more robust financial support mechanisms, and the crucial role of technical capacity building and support services. Addressing these areas through targeted recommendations such as upgrading grid capacity, expanding technical assistance programs, enhancing financial incentives, supporting local production, and fostering collaborative knowledge-sharing can significantly bolster the growth and sustainability of MSMEs in Jordan's RE sector. Ultimately, by implementing these strategies, Jordan can advance towards a more sustainable, competitive, and inclusive energy future, leveraging the potential of MSMEs to drive innovation and economic growth in the transition to clean energy.

The feedback from In-depth interviews indicates that while some state support exists for technological upgrades and expansion, it's often insufficient to cover the costs or incentivize significant shifts towards more sustainable practices. Access to capital and state support for adopting new technologies remains a critical need for MSMEs to grow and compete in larger projects. However, the market for RE and sustainable practices is slowly maturing, with a notable

increase in the number of companies operating in this space. However, there's a lack of sufficient manufacturing companies and a call for more competition based on quality and international standards.

Moreover, while renewable technologies become more accessible, a gap in specialized knowledge for energy efficiency and implementing these technologies in diverse industrial applications remains. Despite existing policies and legislation, the lack of financial support hampers effective policy implementation, coupled with difficulties in finding adequately equipped spaces for renewable projects. For sustainability audits and consulting projects, there is a significant need for building domestic technical capacity, to make MSME-sized projects economically viable. For auditing energy efficiency with existing structures certified Energy Assessors and specialized companies that can provide the necessary technical support and ensure the sustainability of projects are needed.<sup>29</sup> The importance of technical capacity building is seen in demand for certified energy assessors and specialized companies that can offer essential technical support and ensure project sustainability.

According to the interviewees; the local production of solar panels has significantly improved, easing logistic and technical support challenges for MSMEs involved in the installation and maintenance of RE systems. However, the infrastructure and the national grid need development to accommodate RE, highlighting challenges in grid capacity, storage costs, and suitable locations for energy production. While RE technologies are becoming more accessible, there is a gap in specialized knowledge required for energy efficiency and the technicalities of implementing diverse industrial applications.

The insights from various stakeholders highlight the current state of capacity building and technical assistance programs for MSMEs in Jordan's Energy sector, focusing on RE. The feedback underscores the availability of materials, the need for grid development, technical challenges, and the importance of specialized knowledge and they reiterated the need for financial support for implementing energy projects. Below are the key findings and recommendations derived from the interviews.

## **Social and Consumers Factors**

The engagement of MSMEs with RE sources is facilitated by the government's multifaceted approach. They include strategies for enhancing public awareness and education on the benefits of RE, fostering a culture of environmental responsibility, and developing supportive policy and

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<sup>29</sup> Colloquially referred to as Energy Assessors or Energy Consumption Advisor, this specialty is classified within Unit Group 3112 Civil Engineering Technician by the ILO, "International Standard Classification of Occupations-08" p.171, 2012.

regulatory frameworks to encourage investment in green technologies. Despite the challenges of a national transition, the collective efforts of diverse stakeholders highlight a committed path towards an independent, sustainable energy market in Jordan, offering numerous economic and environmental opportunities. Most of the enterprises interviewed for this study acknowledged that they are aware of the information related to the cost of energy that they are shouldering. This does not mean that they can influence that cost directly; however, they can respond to measures to enhance the efficiency of energy use that include RE sources.

### **Enterprise Strategies and Awareness**

Furthermore, the study's FDGs reveal a keen awareness of the challenges MSMEs face, particularly regarding the burden of energy costs. There is an evident gap in awareness and regulation regarding environmental sustainability and carbon footprint management within MSMEs. This gap not only hampers the potential for MSMEs to contribute more effectively to sustainability goals but also limits their ability to compete on a global scale where such factors are increasingly prioritized by consumers and regulatory bodies.

Moreover, the high energy costs and dependency on unreliable energy sources are significant challenges for MSMEs. The adoption of RE, facilitated by supportive policies, offers a pathway to energy independence, operational cost reduction, and enhanced sustainability. However, the transition requires upfront investment and technical support, areas where policy could be more effective. A significant gap in awareness and regulation around environmental sustainability and carbon footprint management within MSMEs could limit their global competitiveness and ability to contribute to sustainability goals. High energy costs and reliance on unreliable energy sources pose additional challenges.

## **CHAPTER THREE: Impact on Different Economic Sectors**

### **Introduction**

The transition towards renewable energy in Jordan presents a significant impact across various economic sectors, depending on the nature of enterprises and the technology they use. Within the Manufacturing sector, the shift towards clean energy sources such as solar and wind power not only promises a reduction in operational costs but also necessitates significant adjustments in production processes and technology adoption. The Industrial sector will see some of the biggest financial returns because of their generally energy-intensive modes of production. In some sectors/enterprises' energy is a prominent element of intermediate production. For example, industries such as plastic, furniture, and mining-related small-scale firms consume more electricity than services or food industries. Accordingly, it is to be expected that the response and desire for the energy transition of the interviewed would vary.

### **Impacts of the Renewable Energy Transition on Economic Sectors in Jordan**

Manufacturers and experts believe that RE, particularly wind and solar, would reduce energy costs and increase competitiveness. Energy-saving technologies like Japanese energy, which relies on coordination of interministerial coordination and increased efficiency in energy conveyance, have been implemented to reduce electricity consumption.<sup>30</sup> However, the transition is marred by infrastructural challenges and the need for greater awareness and encouragement for green energy adoption.<sup>31</sup> The potential for cost savings and efficiency improvement is significant, provided that there's support for overcoming initial financial and technical barriers. The Services sector, encompassing banking and consulting, is progressively acknowledging the financial and operational benefits of green energy, with a noticeable shift towards green financing.<sup>32</sup> This evolution points to a broader recognition of RE's economic advantages, including cost reductions and minimizing risks associated with climate change.

RE's implications for the Agriculture sector are substantial, promising reduced operational costs and more sustainable agricultural practices. Solar energy, in particular, can advance irrigation and farming techniques, bolstering food security and rural development. Similarly, the Tourism sector can harness RE to improve the sustainability of tourism facilities and attractions, positioning Jordan as a desirable destination for eco-conscious tourists.

Despite the clear benefits, each sector faces its own set of challenges in transitioning to renewable energy. The Manufacturing and Service sectors must navigate grid capacity constraints and regulatory barriers, while the Agriculture sector contends with the initial costs

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<sup>30</sup> Nagata, "Japan's Policy on Energy Conservation," 2014.

<sup>31</sup> ESCWA, "Case Study on Policy Reforms to Promote Renewable Energy in Jordan," p.49, 2018

<sup>32</sup> CBJ Jordan, "Green Finance Strategy," p. 10, 2023.

and land requirements for solar installations. For Tourism, the challenge lies in balancing RE investments with the aesthetic preservation of natural and historical sites. To fully capitalize on the benefits of RE, Jordan needs targeted support to overcome these sector-specific challenges.

## **Evaluation of the Challenges and Opportunities Faced by MSMEs within Each Sector**

Opportunities for RE systems offer the potential for significant cost savings for MSMEs, with payback periods as short as 2-3 years and warranties lasting up to 25 years.<sup>33</sup> The RE sector has created several job opportunities in Jordan, both directly within the sector and indirectly in related fields like installation, maintenance, and manufacturing of RE components. Projections on the number of jobs created. Even low-end estimates posit net job creation at 15%–45% above the equivalent energy generation with fossil fuels.<sup>34</sup>

The focus group discussions illuminate the path forward, emphasizing RE as a key to enhancing MSME competitiveness and sustainability. By navigating the initial barriers, such as the cost of solar energy installations and the complexities of obtaining necessary approvals, MSMEs can leverage RE to secure a competitive edge, appealing to an increasingly eco-conscious market. Early adopters in the RE transition can thus not only contribute to national and global sustainability goals but also achieve greater energy independence, stability, and market leadership in the green economy.

## **Opportunities for Inclusion of Vulnerable Groups in Economic Sectors**

The in-depth interviews with experts across various sectors in Jordan highlight significant opportunities for the inclusion of vulnerable groups in the economic sectors as the country transitions towards clean and RE. This transition not only promises environmental and health benefits but also opens up economic and educational opportunities, especially for vulnerable populations.

Opportunities for the Inclusion of vulnerable groups include creating many jobs in the sector, ranging from technical positions like engineers and technicians to broader roles in project management, finance, and administration.<sup>35</sup> This diversification of job opportunities can significantly benefit vulnerable groups, including women and the youth, by providing them with avenues for employment and skill development. Additionally, Jordan should focus on RE in academic institutions and vocational training centers that offer educational opportunities that

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<sup>33</sup> Solar SME, “What is the payback period on a solar panel? —Solar SME,” 2023.

<sup>34</sup> Kis, Z., Pandya, N. and Koppelaar, R.H.E.M. “Electricity generation technologies: Comparison of materials use, energy return on investment, jobs creation and CO2 emissions reduction,” 2018.

<sup>35</sup> MoEnv. “Green Growth National Action Plan 2021-2025,” P.xi, 2020.

can empower vulnerable groups. By gaining knowledge and skills in this growing field, these groups can increase their employability and independence.

The reduction in energy costs associated with adopting RE systems offers direct economic benefits to households, including those from vulnerable groups. Lower energy bills mean more disposable income that can be used for other essential needs, contributing to poverty alleviation. Otherwise, transitioning to renewable energy sources reduces pollution and improves air quality, which has direct health benefits for all, especially for vulnerable populations who might be more exposed or sensitive to environmental pollutants.<sup>36</sup> RE projects can foster a sense of inclusion and empowerment among vulnerable groups. By focusing on inclusive policies and practices, the RE sector can play a crucial role in empowering vulnerable groups, enhancing their economic opportunities, and improving their quality of life. Jordan can ensure that its transition towards a sustainable energy future is inclusive, offering tangible benefits and opportunities for all segments of society, especially the most vulnerable.

In this context, it's worth studying the JREEEF fund experience in Jordan. JREEEF has selected certain areas in Jordan classified as low-income communities across Jordan. The fund arranged for the installation of solar panels wherever that is possible to reduce the energy bills for MSMEs operating in these areas. This scheme has also covered some of the community centres such as municipalities, youth centres and mosques. Such schemes have contributed to improving the well-being of these targeted local communities.

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<sup>36</sup> US DOE, "Improving Air Quality with Solar Energy," 2007.

## **CHAPTER FOUR: Impact on Inclusive Economic Growth, Innovation and Competitiveness**

### **Introduction**

This chapter analyzes how MSMEs are driving the RE transition, from spearheading innovative solutions to collaborating with larger energy companies and underscores the transformative potential of these endeavors for the broader socio-economic context. Through an analysis of the impact of the transition on the labor market, skills demand, and the retraining of workers, and promotion of positions for women, this chapter sheds light on the transformative effects on MSMEs' competitiveness and the achievement of national social objectives. Furthermore, it highlights the challenges and opportunities faced by marginalized groups within the MSME sector, emphasizing the importance of inclusive policies and targeted interventions to ensure that the benefits of the RE transition are equitably distributed across society.

### **Importance of the Energy Transition in Generating Green Jobs for the Long-term Sustainable Development Goals**

The adoption of RE technologies by individuals, communities, the public sector, and firms, will lead to energy independence. Central to this discourse is the emphasis on reducing carbon footprints through more sustainable manufacturing processes and a pivot towards RE sources. Such efforts not only align with global climate objectives but also promote energy independence by reducing reliance on imported fossil fuels, thereby conserving financial resources, and diminishing the impact of global energy market volatility on Jordan's economy.

The expansion of RE infrastructure further invigorates the local job market by fostering domestic labor opportunities and enhancing manufacturing capabilities, thus contributing to a durable and sustainable employment landscape. RE's ascendancy opens avenues for economic diversification, notably in EV services, and solar and wind energy, catalyzing the creation of specialized green jobs. This surge in demand for skilled labor necessitates investments in education and training to prepare the workforce for the burgeoning green economy. Furthermore, a focus on RE propels innovation and technological adoption, underpinning economic growth and job creation in emerging sectors. This is seen with EVs with EV maintenance and the installation of charging stations. For residential RE systems there will be services for smart meters, batteries, and energy generation hardware (solar panels and turbines).

## **Contributions of MSMEs in the RE Transition to Inclusive Economic Growth, Job Creation, and Poverty Reduction**

The role of MSMEs in Jordan's RE transition underscores their critical contribution to inclusive economic growth, job creation, and poverty alleviation. Through the adoption and innovation in RE technologies, MSMEs are instrumental in reducing reliance on imported fuels, thereby saving foreign currency and enhancing economic resilience. Such a shift in their behavior may lead to the creation of local manufacturing opportunities and job creation. MSMEs, through RE projects, contribute to job creation directly within the RE sector and indirectly by promoting exports and fostering a service ecosystem around RE.

MSME involvement is essential in response to international trade restrictions, such as those imposed by the EU Green Deal, and in overcoming challenges within Jordan's Energy sector. RE adoption by MSMEs not only positions them at the forefront of Jordan's energy transition but also boosts economic competitiveness, particularly in energy-intensive industries, facilitating domestic and international market expansion.

## **Collaborations and Partnerships between MSMEs and Larger Energy Companies**

The focus group discussion sheds light on the dynamics of these collaborations within Jordan's RE landscape. It points out that larger companies, motivated by the need to reduce high energy costs, were among the early adopters of RE solutions. This shift, initially driven by financial considerations, has broader implications for the Energy sector, influencing MSMEs' trajectory and shaping the overall landscape of energy efficiency and RE adoption in Jordan.

## **Involvement of MSMEs in Research and Development for Energy Innovations**

MSMEs are pioneering in integrating RE systems into sectors such as Agriculture, demonstrating a direct link between sustainability and food security. These projects not only push the envelope in terms of what's technologically possible but also provide practical, scalable solutions for critical global challenges. On the other side, entrepreneurs have observed a significant shift in public perception of RE systems. This cultural shift, from skepticism to active interest, underscores the importance of MSMEs in driving consumer awareness and adoption of RE technologies.

MSMEs are taking crucial initial steps by conducting energy audits and implementing efficiency measures, paving the way for RE solutions. Furthermore, they play a vital role in promoting green skills and knowledge through educational initiatives, ranging from vocational training to influencing school curricula, ensuring the next generation is well-prepared to support sustainable energy goals.

A gap remains in awareness and access to support programs for R&D in energy innovations, underscoring the need for increased knowledge and resources for MSMEs expansion. Despite RE contributing only modestly to the Industrial sector's energy consumption, focus group discussions within Jordan's Industrial sector reveal the necessity for enhanced energy efficiency and the adoption of renewable solutions. The geographical concentration of renewable adoption and broader systemic challenges in energy efficiency indicate an area where MSMEs, with their agility and local insights, can lead innovative R&D efforts to improve energy solutions tailored to specific needs.

By developing new technologies or enhancing existing ones, MSMEs are critical for addressing energy efficiency and increasing RE uptake. Their collaboration with larger companies, academia, and government is essential to accelerate the innovation and implementation of energy solutions, demonstrating the significant role MSMEs play in the transition towards more sustainable energy systems.

### **Impact of the RE Transition on MSMEs, the Labor Market, Skills Demand, (RE) Training of Workers, Highlighting Marginalized Groups**

Evaluating the impact of the RE transition on MSMEs, the labor market, skills demand, and the (re)training of workers, particularly among young people, women, and other marginalized groups, involves analyzing various factors influenced by this transition. The insights gathered from experts across different sectors provide a comprehensive view of how the shift toward RE affects these areas.

The transition to RE necessitates a workforce equipped with 'green skills', including knowledge of RE technologies, energy efficiency, and sustainable practices. This requires a comprehensive approach to vocational training and higher education. The emphasis on technical education and the development of green skills, as discussed by experts, is critical. Tailoring curricula for the next generation to include RE and energy efficiency topics will prepare the workforce for the evolving demands of the RE sector.

As the RE sector grows, it demands a workforce proficient in renewable technologies and energy efficiency solutions. Yet, the high costs of training and certification pose significant challenges, risking a skills mismatch in the labor market that could hamper productivity and innovation. Moreover, the transition presents a prime opportunity to foster inclusivity by extending vocational training to marginalized groups. If the high costs are not reduced emerging markets will represent the same exclusive focus.

The RE sector is marked by a scarcity of skilled technicians for the installation and maintenance of RE systems, underlining the necessity for targeted training and education programs. The RE

sector will create a vast number of new jobs and sustained opportunities for increased employment;<sup>37</sup> it offers distinct opportunities in specialized skill areas crucial for the installation, maintenance, and operation of renewable technologies.

Addressing the need for a 'green-skilled' workforce entails a holistic approach to vocational training and higher education, with curricula tailored to include topics on RE, energy efficiency, and sustainable practices. By focusing on technical education and the cultivation of green skills, the transition to RE can navigate the current obstacles and harness the sector's full potential for economic and environmental benefits, ensuring a more inclusive and sustainable future.

### **Effects on the Competitiveness of MSMEs in Local and International Markets**

The desire to engage in energy transition is dictated by the monthly bills amongst other factors. The transition for the latter group enables MSMEs to significantly lower their energy expenses, which are often a major component of their operational costs. This reduction not only boosts their profitability but also enhances their competitiveness, more so for those competing against firms in regions with lower energy costs. By embracing RE and energy efficiency measures, MSMEs can distinguish themselves in the market, a factor becoming increasingly crucial as international buyers grow more focused on sustainability. This alignment with global environmental standards, such as the EU Green Deal, facilitates easier access to international markets previously restricted by carbon footprint considerations. Despite the benefits of energy efficiency in complementing RE efforts and further cost reductions, its adoption lags, partially due to insufficient awareness and support.

The current shortage of skilled technicians poses a challenge, yet it also offers an opportunity for targeted workforce development and training initiatives. Without intervention, there is potential for international labor or an oligopoly of local green tech to dominate the emerging market. This outcome would be less competitive and less inclusive than the result of deliberate intervention. There's a pressing need for education and training programs focused on green skills to support the RE shift, requiring adjustments in vocational training and higher education curricula to equip the workforce for the changing job market. This comprehensive approach will ensure that MSMEs can navigate the complexities of the RE transition, leveraging its benefits to improve their competitive stance both domestically and internationally.

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<sup>37</sup> Kis, Z., et al., R.H.E.M. "Electricity generation technologies: Comparison of materials use, energy return on investment, jobs creation and CO2 emissions reduction." 2018 pp. 144-157.

## **CHAPTER FIVE: Impact on Achieving Sustainable Development Goals (2030)**

### **Introduction**

The chapter delves into the pivotal role of MSMEs in driving the clean energy transition within Jordan. This transition aligns with the UN SDGs. However, achieving these goals requires robust governmental policies, regulatory frameworks, and supportive initiatives to guide and incentivize MSMEs towards sustainable practices. Collaboration between various stakeholders, including government, private sector, financial institutions, and MSMEs, emerges as paramount in navigating this transition effectively. The experts' testimonies are corroborated by the SDGs and the IRENA Renewable Readiness Assessment.

### **MSMEs in the Renewable Energy Transition Contributing to Achieving Specific SDGs**

The involvement of MSMEs in the RE transition plays a crucial role in achieving specific (SDGs), particularly those related to affordable energy and RE (SDG 7), decent work and economic growth (SDG 8), industry, innovation, and infrastructure (SDG 9), sustainable cities and communities (SDG 11), and climate action (SDG 13).<sup>38</sup>

The insights were gathered from interviews with diverse and representative samples from MSMEs, scientists, technicians in RE, the Jordanian government, foreign investors, bankers, local banks, and the private sector. They highlight several critical areas where MSMEs contribute to the RE transition and the achievement of SDGs. Also, they identify knowledge gaps and inconsistencies about RE across sectors and firm size from the sample participants. Furthermore, the SDGs that benefit from certain suggestions are noted.

Engineers and experts emphasize the importance of adopting clean and RE technologies, such as solar and wind energy, in reducing carbon emissions and enhancing energy efficiency. Though other RE technologies have great potential, their cost and potential energy outputs make them less attractive than wind and solar. There is one biogas plant in Rusaifeh landfill that produces 1 MW of electricity, but this technology's utilization has been fairly low relative to wind and solar. The push towards green hydrogen and energy storage solutions also represents areas where MSMEs can innovate and contribute significantly to the RE transition, but are yet underutilized. The UN emphasizes higher deployment of renewables for achieving goals 7, 11, and 13 of the SDGs and globally public financing for RE has been on the decline since pre-COVID-19.<sup>39</sup> The

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<sup>38</sup> UN, "The Sustainable Development Goals Report 2023: Special Edition," 2023.

<sup>39</sup> UN, "The Sustainable Development Goals Report 2023: Special Edition," p. 27, 2023.

higher adoption rates of RE with MSMEs will increase energy output (7), provide a more dispersed and accessible electricity production network (11), and lowers the Energy sector's carbon footprint (13).

The role of government in setting policies, strategies, and regulatory frameworks is highlighted as essential for guiding and supporting MSMEs in the transition to RE. Initiatives like energy efficiency standards, incentives for RE adoption, and stringent environmental regulations are crucial for encouraging MSMEs to align with sustainable practices.<sup>40</sup> These policies and frameworks will especially impact goals 8 and 9 in terms of guiding economic growth and industry standards, with implications for goal 13 as well.

The importance of capacity building, awareness, and education among MSMEs and the broader community about the benefits and importance of RE and sustainability practices, is stressed. Training programs and awareness campaigns can help in bridging knowledge gaps and promoting sustainable practices. This ties into meeting components of SDG 8 and 11 since communities are benefiting from increased knowledge and capacity to participate in the RE transition in the Kingdom. Additionally, this knowledge can motivate MSMEs to participate in sustainable growth strategies that will decrease costs and increase technical capacity supporting higher economic growth.

The interviews underscored the need for accessible financing mechanisms for MSMEs to invest in RE technologies. Financial incentives, green financing, and supportive banking policies are vital to enable MSMEs to make the transition. Programs like JREEEF are going to be critical in expanding access to RE technology financing and creating a sector with more innovative capacity across firm sizes.<sup>41</sup>

The involvement of MSMEs in the RE transition is indispensable for achieving specific SDGs, particularly 7, 8, 9, 11, and 13. Through innovation, adoption of sustainable practices, and active participation in the green economy, MSMEs can contribute significantly to the RE transition. However, this requires a supportive ecosystem that includes consistent and supportive policies, accessible financing, capacity building, and collaborative efforts across all sectors. The involvement of MSMEs in the RE transition can be significantly enhanced, contributing to the achievement of the SDGs and paving the way for a sustainable and environmentally responsible future.

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<sup>40</sup> IRENA, "Renewable Readiness Assessment: The Hashemite Kingdom of Jordan," p. 50, 2021.

<sup>41</sup> IRENA, "Renewable Readiness Assessment: The Hashemite Kingdom of Jordan," p. 14, 2021.

## **CHAPTER SIX: Opportunities and Constraints**

### **Introduction**

This chapter illuminates the complexities surrounding grid stability and infrastructure, shedding light on the technical intricacies that MSMEs must navigate to thrive in the RE landscape. Through expert insights and analysis, this chapter dissects these challenges, offering an understanding of the technical terrain MSMEs must traverse in their quest for sustainable energy solutions.

Moreover, the chapter delves into the broader spectrum of constraints faced by MSMEs venturing into the RE market. From political, technical and administrative barriers to economic and financial constraints, the discussions unveil impediments hindering the full realization of the RE transition in Jordan. By examining notable examples of successful implementation and extracting lessons about best practices, the chapter equips stakeholders with the knowledge and insights necessary to surmount these obstacles and propel Jordan towards a more sustainable and prosperous energy future.

### **Identifying Opportunities for MSMEs in the Renewable Energy Sector**

The transition to RE presents significant opportunities and challenges for MSMEs especially in regions with high solar radiation, like Jordan.<sup>42</sup> This transition can drastically reduce operating costs for MSMEs, particularly those owning electric vehicles or in the Manufacturing sector, through advancements in solar technology, such as panels that double as windows and tiles. These innovations signal a shift towards multifunctional, aesthetically pleasing RE solutions and underscore the necessity for MSMEs to not only invest in RE but also to enhance their energy efficiency.

Financing options, including those with remarkably low interest rates backed by the Jordanian Central Bank, present an underutilized avenue for RE investments.<sup>43</sup> The existing gap in the technical understanding of RE systems among financial institutions and regulatory agencies and those responsible for infrastructure development further complicate the transition. Fluctuating laws and regulations, such as inconsistencies in net metering versus net billing policies, add to the uncertainty for potential investors. Despite these obstacles, the potential for MSMEs in the RE sector remains significant, with opportunities in finance, technology, capacity building, and market access. Overcoming regulatory uncertainties, bridging the knowledge gap among financiers and investors, and addressing infrastructural constraints are essential steps

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<sup>42</sup> Maguire, "The top solar power potential hotspots," 2023

<sup>43</sup> CB of Jordan, "Green Finance Strategy 2023-2028," 2023

towards realizing the full potential of RE for MSMEs, contributing to Jordan's broader economic goals and global competitiveness.

## **Technical Challenges for Grid Stability and Infrastructure**

Experts have identified several weaknesses in current laws and infrastructure that hinder the efficient use and storage of RE. Regulatory restrictions that prevent energy storage and use during off-peak hours, along with the high cost of storage solutions such as batteries, pose critical concerns. The existing electrical network infrastructure is also not sufficiently developed to support the integration of RE sources, especially in remote areas. Furthermore, incorporating RE sources, like wind energy, introduces variability and unpredictability into the power supply, which can jeopardize grid stability. Such sudden changes in power production necessitate sophisticated management of frequency and voltage to maintain grid reliability.

## **Discussions with Experts on Constraints and Barriers Faced by MSMEs**

### **Opportunities Created by the Renewable Energy Transition for the Labor Market**

The transition to RE is poised to significantly impact job creation across various sectors. As indicated by the experts, this transition involves not only the manufacturing and installation of RE systems, such as solar panels and wind turbines, but also encompasses a wide range of supporting industries including the production of components like cables, metal structures, panels and batteries. This expansion into RE is expected to stimulate job growth in both the Manufacturing sector and the installation and maintenance of RE systems. Additionally, the reduction in operational costs, particularly energy costs, is projected to boost investment opportunities and, consequently, create numerous job opportunities across different industries.

For example; Jordan's pioneering efforts, exemplified by projects like the Shams Ma'an solar station, have established it as a leader in the region, generating not only direct jobs in installation, maintenance, and operation but also setting a precedent for skill and knowledge development within the country. Despite facing challenges such as bureaucratic hurdles and inadequate support from electricity companies, Jordanian companies and professionals have earned recognition abroad, contributing to RE projects in countries like Morocco, Saudi Arabia, and Dubai.

Jordan's geographical attributes, including swaths of land with high solar radiance and low population density, provide a unique platform for RE innovation, reminiscent of initiatives like Singapore's floating solar panels.<sup>44</sup> The active involvement of entities such as the German GIZ, the Royal Scientific Society, and the Jordan Chamber of Industry in professional training and

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<sup>44</sup> Lin, "Singapore unveils one of the world's biggest floating solar farms," 2021

development in the RE sector underscores a solid foundation for capacity building. However, the challenge remains to retain this burgeoning talent within Jordan, ensuring that the benefits of this green transition are fully realized domestically, thereby contributing to the country's economic growth and sustainability.

## **Political, Administrative and Economic Constraints to a Renewable Energy Market**

The frequently cited challenge involves cumbersome regulations, laws, and bureaucracy. The process of obtaining approvals for RE systems is marked by difficulties, pointing to a regulatory environment that may not fully support or facilitate the RE transition. Changes to previously established laws, such as the Renewable Energy Law, without proper implementation or adherence to the original vision, further complicate the situation.

Legal and technical barriers arising from long-standing agreements with fossil-fuel energy producers necessitate a carefully strategized and gradual plan for integrating RE sources. This need aligns with the broader challenge of managing the transition's initial high costs, particularly for the requisite RE infrastructure. The potential job losses in traditional Energy sectors highlight the critical need for retraining and skill development programs to ensure a seamless workforce transition to burgeoning RE roles. But even by the most conservative estimates, net jobs will increase with new energy sources.<sup>45</sup> In a decentralized network of energy providers the job creation benefits are bolstered. Moreover, reducing fossil fuel imports bears geopolitical implications, especially for countries heavily reliant on energy imports, potentially affecting relationships with traditional energy suppliers.

The transition's broader implications, including potential job losses in sectors related to fossil-fuel based energy generation and geopolitical tensions from reduced fossil fuel imports, underscore the complex interplay of economic, social, and political factors in the shift towards RE. The restricted market entry for new players and innovations due to a complicated regulatory environment and insufficient support for energy service companies further signal the need for a more supportive framework to realize a full RE transition.

In conclusion, overcoming these challenges requires a concerted effort from governments, businesses, and the international community to streamline regulatory processes, ensure consistent policy implementation, and provide stable financial incentives. It also calls for strategic

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<sup>45</sup> Kis, Z., Pandya, N. and Koppelaar, R.H.E.M. "Electricity generation technologies: Comparison of materials use, energy return on investment, jobs creation and CO2 emissions reduction," 2018.

planning to address social and geopolitical implications, ensuring a just and equitable transition to a sustainable energy future.

## **Financial Constraints and Investment Needs**

There is a growing demand for enhanced government support to alleviate the financial strain on companies making the switch to RE. Such support could include tax incentives and subsidies, addressing the mismatch between current policies and the long-term nature of RE investments.

Traditional banking systems and financial institutions may be hesitant to provide loans for RE projects due to perceived risks or a lack of familiarity with the sector. This issue is compounded by the need for financial products tailored to the unique characteristics of RE investments, such as longer payback periods and initial high costs. The legislative and regulatory framework plays a pivotal role in either facilitating or impeding RE investments, with frequent policy changes, regulatory ambiguity, or overly restrictive laws serving as deterrents to potential investors and innovators in the field.

Investment in storage technologies is emerging as a critical step towards maximizing RE's potential, addressing the intermittency issues of renewable sources and ensuring a stable energy supply. Furthermore, the energy infrastructure needs upgrades and expansion to support the integration of REs, including grid improvements and the adoption of smart grid technologies. Equally important is the investment in education, training, and capacity building to prepare the workforce with essential skills for the RE sector, encompassing both technical expertise and financial and regulatory knowledge.

A notable gap exists in programs specifically aimed at assisting MSMEs in securing financing for green transitions, including investments in RE systems for various applications. Skepticism about the economic viability, fueled by a limited awareness of the benefits of RE and concerns over long recovery periods for investments, hampers demand. The overall economic climate further influences the hesitance of businesses to invest in new systems, wary of uncertainties in the labor market and the extended ROI period. Terms of financing, such as monthly instalments and total payback periods, become crucial considerations, making the prospect of RE investments less attractive for some despite the clear long-term financial and environmental gains.

## **Notable Examples of Successfully Implementing the Energy Transition with MSMEs Involvement**

The insights provided by the experts highlight the varied landscape of RE transition across different countries and regions, with a particular focus on the involvement of MSMEs. The success stories and challenges encountered point towards several key factors that influence the effectiveness of energy transition efforts.

Saudi Arabia despite being an oil-rich nation with low electricity costs, is setting green economy standards that influence manufacturing and export practices in neighboring countries, including Jordan. This suggests a strategic move towards sustainability standards, which can impact regional markets and encourage MSMEs to adopt green practices to maintain competitiveness. Additionally, oil-producing countries are beginning to reduce oil production to maintain oil prices while expanding alternative energy sources, signaling a deliberate shift away from fossil fuel dependency. Though Jordan does not have the same financial opportunities, it can analyze regulatory frameworks used, and has potential trans-regional partnerships in these countries.

In Europe, the reliance on renewable sources such as wind energy brings to light the challenges related to geographical and climatic conditions. The continent's recent energy crisis, exacerbated by geopolitical tensions, has highlighted the critical need for energy security and diversification, prompting an accelerated transition to RE sources.<sup>46</sup> Energy independence is a powerful political driver in energy transitions and increases sovereignty while insuring against international supply-side shocks that can have a massive negative economic impact. Jordan has begun a path of interdependence with Iraq in exchanging electricity through connected grids but remains highly dependent on imports for 90% of its energy.<sup>47</sup>

Countries like Germany, Denmark, and Kenya, and states like California in the USA, demonstrate various approaches to incorporating MSMEs into the RE sector. Germany, with its Energy policy,<sup>48</sup> Denmark's community and MSME involvement in wind energy through cooperative models and government-backed financing, Kenya's emphasis on geothermal and solar energy supported by accessible financing, and California's aggressive RE targets and PACE programs, showcase the importance of financial incentives, feed-in tariffs, and supportive legislation in fostering a robust market for MSMEs in the renewable industry.

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<sup>46</sup> Crowley-Vigneau, et al. "What motivates the 'green' transition: Russian and European perspectives," 2023.

<sup>47</sup> Jordan Times, "Jordan-Iraq electricity interconnection to go live on Saturday," 2024.

<sup>48</sup> Tsafos, "In Defense of the Energiewende," 2020

## **Lessons Learned and Best Practices from Successful Cases**

Successful cases demonstrate the significant economic benefits and cost savings that RE systems can offer to businesses and households alike, particularly in reducing electricity and transportation costs. Also, the enactment of supportive laws, such as the Renewable Energy Law, is crucial. However, effective implementation and clarity in regulations are necessary to avoid discouraging investment and innovation. In addition, tailored financial products and services, alongside technical support, are essential to overcome the initial investment barriers and perceived risks associated with RE projects.

The economic feasibility, coupled with environmental benefits, presents a compelling case for the adoption of best practices in RE technology implementation. Jordan can continue to harness its RE potential, reduce its dependence on imported fuels, and achieve greater economic and environmental sustainability by using shared knowledge from regions that have successfully utilized RE.

## **Technological limitations and Infrastructure Requirements**

The significant costs associated with purchasing and maintaining batteries, particularly lithium ones, due to customs and material costs, pose considerable barriers. The reliance on batteries for off-grid solutions and their limited lifespan further complicates these issues. A notable gap in understanding and acceptance of RE technologies among financiers and regulators impedes the financing of innovative projects and the expansion of RE loans. Moreover, the current infrastructure and regulatory frameworks are ill-equipped to support the seamless integration of RE systems, especially for setups aiming to utilize daytime renewable generation alongside night time grid consumption. Comparative insights from regional RE policy initiatives, such as in Saudi Arabia highlight the advantages of adopting more flexible regulatory approaches.

For Jordan to fully harness the potential of RE, the grid infrastructure and legislative framework must evolve to accommodate these systems efficiently, particularly those relying on battery storage for off-grid or hybrid applications. This includes updating legislation to reflect technological advancements in RE and streamlining the approval processes for system installations, ensuring a smoother transition to renewable sources by addressing key issues like surplus energy calculation and storage solution approvals.

## **CHAPTER SEVEN: Conclusions and Recommendations**

### **Conclusion**

Jordan is pivotal juncture in its energy transition, moving from reliance on fossil fuels—with their associated economic, environmental, and security challenges—towards a greener, more sustainable energy framework that taps into its significant renewable energy resources and capabilities. This transition is especially vital for MSMEs, which, despite facing potential challenges like new taxes and regulatory restrictions, can greatly benefit in terms of cost savings, enhanced competitiveness, job creation potential and sustainability. Nonetheless, the journey towards fully embracing renewable energy is beset with hurdles such as bureaucratic and financial constraints, infrastructural deficits, and shortages of properly trained workers highlighting the urgent need for creative and forward-thinking government policies.

The integration of new renewable technologies and addressing the immediate impacts of moving away from fossil fuels, including job displacement and geopolitical concerns, necessitate thoughtful planning and supportive strategies. There is a gap within the MSMEs in terms of their desire and awareness of what is needed to realize the benefit of energy transition in the long run. This means that not only governments' actions matter, but also the responsiveness and the capacity within the targeted enterprises as well. It is a challenge on both the demand and supply sides. Technology, and accordingly cost and efficiency, are rapidly changing within the RE sector; so stability and a long-term view are crucial in motivating MSMEs to embark on an energy transition.

Some success stories can be used to motivate skeptical enterprises to embrace RE initiatives; surely the road ahead is still long but as time passes MSMEs awareness is evolving towards using RE for environmental and economic competitiveness reasons. That would have positive social outcomes in terms of creating good jobs, especially from marginalized groups; instilling new skills and capacity building in the RE sector which is expected to be a leading sector shortly.

## Recommendation

The pillars of the transition revolve around the desire to change on the side of the MSMEs; the regulatory framework; accessibility of finance; enhancing MSME awareness of RE benefits; capability to adopt new technologies; training the requisite labor force; and infrastructure readiness:

1. **Enhance Renewable Energy Financing:** Attract investment from both public and private sectors as well as international finance and investments into renewable projects like solar and wind energy, capitalizing on Jordan's natural resources. Additionally, explore Innovative Financing Models such as developing green corridors, and encouraging the creation of innovation ecosystems to boost investment and collaborative efforts in the Renewable Energy sector including private-public sector collaboration.
2. **Refine Policy Frameworks and Regulations:** Develop and implement policies to ease renewable energy adoption, streamline regulatory procedures, and offer incentives and subsidies to encourage participation from businesses, NGOs and households. This will bolster MSMEs' participation in the green economy, fostering public-private cooperation and favorable financing conditions. The government also can simplify regulatory frameworks and coordinate policy execution across sectors to strengthen MSMEs' role in the green economy.
3. **Invest in Capacity Building and Raise Public Awareness:** Focus on professional training and public education to foster a culture of renewable energy implementation, utilization and understanding.
4. **Implement Monitoring and Adaptation Measures:** Develop robust systems for tracking renewable energy progress and integrating climate adaptation strategies, such as water conservation and sustainable farming practices to enhance resilience.
5. **Upgrade Infrastructure for Renewable Integration:** Improve the grid and other infrastructures to support Renewable Energy integration and expand technical assistance services, increasing the sector's competitiveness.
6. **Develop Sector-Specific Strategies:** Provide specific strategies to the unique energy demands of different sectors, complemented by capacity-building and information-sharing initiatives to ensure broad support for energy efficiency and renewable resource adoption. Also, it was clear that Micro enterprises are less aware and lack the capability of engaging in energy transition which requires some specific measures such as energy audits that might precede the full energy transition.
7. **Capitalize on the potential of MSMEs to create meaningful jobs, particularly for the youth, women and marginalized groups.**

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## Annex:

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	31	Eng. Shehab Ismail	Retired Royal Air Force Officer with a Diploma in Aeronautical Engineering and Bachelor in Mechanical Engineering
	32	Osama Saed	Founder of Renewable Energy Company
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	34	Eng. Aseel Sa'edeh	Spanish company for manufactures and operates wind turbines
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