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Unpacking Market Barriers to Energy Efficiency in Emerging Economies: Policy Insights and a Business Model Perspective from Jordan

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Abstract: Energy efficiency (EE) remains an underexploited opportunity in many developing economies, where a complex interplay of policy, institutional, and market-related challenges limit its implementation at scale. This study explores the structural, economic, and policy-related constraints affecting the EE market in Jordan, a country with a high dependence on imported energy. Using a multi-framework approach, we apply the political, economic, social, technological, environmental, and legal (PESTEL) framework to categorize these barriers, complemented by Brown's business model (BM) typology to enhance the analytical depth. Primary data were collected through semi-structured interviews with key market actors. The findings highlight issues such as economic volatility, regulatory fragmentation, and the structural biases associated with donor-driven interventions, which contribute to an uneven and loosely regulated market environment in which businesses face significant scaling challenges. This study reflects on international experience to explore how strategies from other contexts might inform markets' adaptation in emerging economies. This study concludes with targeted policy recommendations aimed at clarifying regulatory pathways and supporting more effective market delivery. This research contributes to ongoing policy discourse by highlighting how context-specific BM innovations might help address systemic barriers, while potentially supporting national energy goals.

Keywords: energy efficiency; residential energy retrofit; PESTEL barriers; business models; developing countries; policy reform; Jordan

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1. Introduction

Energy efficiency (EE) is pivotal for achieving global climate and sustainability goals, particularly in the built environment, which accounts for approximately 40% of global energy consumption [1,2]. Yet, despite the residential sector's recognized potential, progress remains slow, especially in developing economies where systemic barriers persist [3].

In a developing country such as Jordan, acute energy challenges persist, with over 90% of its energy supply is imported [4], making it highly vulnerable to price volatility and supply disruptions. Concurrently, rapid urbanization intensifies the need for sustainable housing solutions, positioning residential energy retrofits (RERs) as a critical but underdeveloped policy area [5]. While energy consumption in Jordan's residential sector continues to rise [6], comprehensive EE initiatives have lagged behind, particularly those focusing on passive retrofit measures such as building-envelope improvements [7].

Despite this pressing need, the widespread adoption of RERs is hindered by multi-dimensional barriers spanning political, economic, social, technological, environmental, and legal (PESTEL) domains [8]. Financial constraints, fragmented governance structures, limited consumer awareness, and a lack of integrated service delivery models all combine to impede market transformation [9,10]. Overcoming these challenges requires not only regulatory reform but also innovation in business models (BMs) that can deliver end-to-end retrofit services at scale [11].

Although previous research has explored RER barriers in various global contexts (e.g., [12,13]), limited attention has been given to how market-based mechanisms—particularly, One-Stop Shop (OSS) frameworks—could catalyze residential retrofit adoption in developing countries. Furthermore, most studies focus on developed economies, overlooking unique institutional, economic, and behavioral dynamics in regions like Jordan. This study addresses this gap by combining empirical insights with theoretical models to propose actionable reforms for enhancing Jordan's RER market.

To structure this investigation, this study integrates two complementary frameworks: a PESTEL analysis to map macro-environmental barriers [14] and Brown's [15] BM framework to assess the operational structure of retrofit service providers. Together, these frameworks provide a holistic lens for diagnosing systemic issues and identifying pathways for aligning market practices with integrated delivery solutions, such as OSS models [16].

Accordingly, this research investigates the structure and effectiveness of BMs supporting EE in Jordan. A qualitative case study methodology is employed, drawing on semi-structured interviews with market actors, policy document analysis, and market mapping. The paper proceeds as follows: Section 2 reviews the relevant literature and theoretical frameworks; Section 3 outlines the research methodology; Section 4 presents the empirical findings; Section 5 analyses these findings; Section 6 discusses policy implications; and Section 7 concludes by reflecting on the findings and limitations and suggesting directions for future research.

2. Literature Review and Theoretical Framework

2.1. Barriers to EE in Developing Markets

Improving EE in the residential sector is recognized as a critical strategy for achieving sustainable energy transitions globally [17,18]. However, while many high-income countries have successfully implemented large-scale retrofit programs through innovative BMs and integrated policy frameworks [16,19], the residential EE markets in developing economies often remain fragmented and underdeveloped [20]. Common barriers include limited access to financing, weak regulatory frameworks, low consumer trust, and fragmented supply chains [21,22].

In particular, studies show that consumer decision-making in emerging markets is heavily influenced by upfront costs rather than long-term savings, making it difficult to promote investment in comprehensive retrofits [23]. The complexity of coordinating multiple stakeholders—auditors, suppliers, contractors, and financiers—further hampers retrofit uptake when integrated service models are absent [24].

Recent empirical research highlights that without a bundled service delivery and financial facilitation, retrofits tend to focus on isolated interventions, such as lighting upgrades or renewable energy installation, rather than deep building-wide energy savings [25,26]. These findings emphasize the importance of addressing both market fragmentation and consumer trust in designing effective retrofit business models.

2.2. The Role of BMs in RER Uptake

BMs are defined as conceptual frameworks outlining the value a firm provides to its customers, including mechanisms for value delivery and revenue generation [27]. BMs are crucial for structuring RER services to maximize their accessibility and impact [28].

BMs play a pivotal role in shaping how EE solutions are delivered and adopted. In the context of energy retrofits, innovative BMs are necessary to overcome traditional market failures by coordinating service delivery, facilitating financing, and managing performance risks [29]. The emergence of integrated delivery models, such as the OSS framework, demonstrates that customer-centered, bundled service offerings significantly improve retrofit uptake [30].

The OSS model aims to simplify the customer journey by providing a single point of access for audits, financing, implementation, and monitoring, thus reducing transaction costs and increasing consumer confidence [15,16]. In addition, performance-based contracts—where service providers share the risk and benefits of EE outcomes—have proven effective in mature markets [31].

However, as noted by Biere-Arenas et al. [32], transplanting these models into developing markets without adapting to local constraints can be ineffective. Instead, hybrid BMs that blend OSS principles with context-specific financing, regulatory, and institutional innovations are recommended [33].

2.3. Research Gap

Although there is growing literature on OSS models and EE BM innovation in Europe and North America, studies addressing their adaptation to emerging markets remain limited. The existing research largely focuses either on macro-level policy challenges or on isolated technical solutions, without sufficiently exploring how market actors in developing economies navigate systemic barriers to retrofit delivery [1,19].

To investigate the factors influencing EE BM development in Jordan, this study combines the PESTEL framework with BM theory. PESTEL—examining political, economic, social, technological, environmental, and legal dimensions—provides a structured lens to analyze macro-environmental conditions [34]. It is widely used in strategic management to assess external barriers and opportunities [14].

However, while PESTEL offers a broad context analysis, it lacks the granularity needed to capture the complex dynamics of service delivery, customer interaction, and financial structuring specific to energy retrofits. Therefore, building on the limitations identified by Bertoldi and Boza-Kiss [35], this study complements PESTEL with the BM framework proposed by Brown [10], which dissects the value proposition, customer interface, supply chain integration, financial model, and governance dimensions [36].

This integrated analytical approach combining PESTEL-BM, supported by a multiple stakeholders' perspective, provides a richer foundation for understanding how macro-environmental barriers translate into BM constraints—and where opportunities for innovation and policy intervention lie to improve the effectiveness and scalability of the Jordanian residential retrofit ecosystem.

2.4. Case Study Context: Jordan

Before detailing the research methods, this section outlines the contextual rationale for selecting Jordan as a representative case for analyzing RER challenges and BM innovation.

2.4.1. Energy Dependency and Demand Profile

Jordan is one of the most energy-vulnerable countries in the Middle East, importing approximately 95% of its total energy [37]. This reliance makes the country highly susceptible to international fuel price fluctuations and supply disruptions.

In recent years, growing urbanization and climate extremes have exacerbated residential energy consumption, driving a greater need for sustainable energy solutions. The residential sector alone accounts for nearly half of the country's electricity consumption [7]. Within this sector, heating and cooling comprise 57% of energy use—underscoring the potential for energy savings through building upgrades [38,39] (Figure 1).

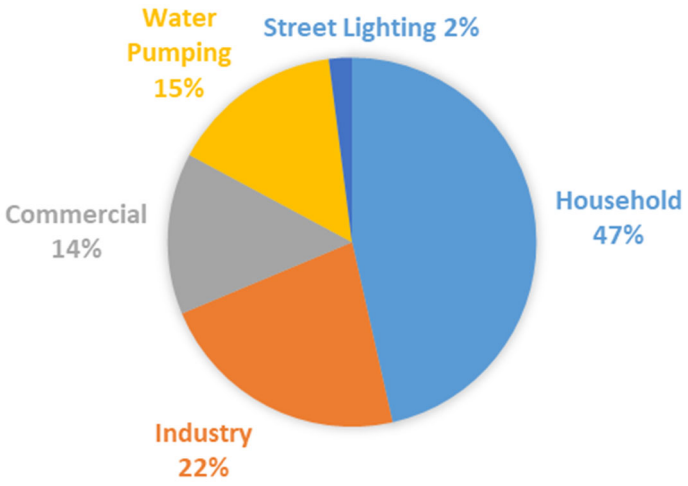

Figure 1. Total electricity consumption by sector in Jordan (2018).

Furthermore, 83% of Jordan's electricity is generated from fossil fuel sources, highlighting the carbon-intensive nature of its power supply [40] (Figure 2).

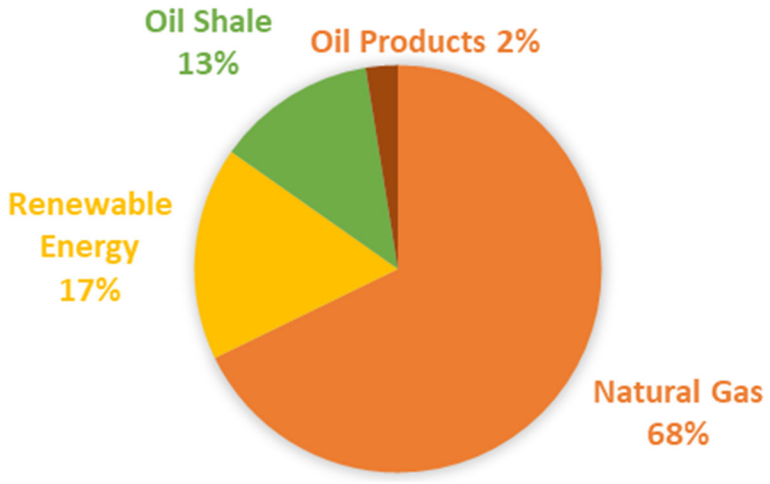

Figure 2. Electricity generation by fuel type in Jordan (2019).

When disaggregated by household energy use, electricity and oil products together account for 85% of total final consumption [6,41]. This reliance on imported fuels translates into high household energy bills, particularly burdening low- and middle-income families [42] (Figure 3).

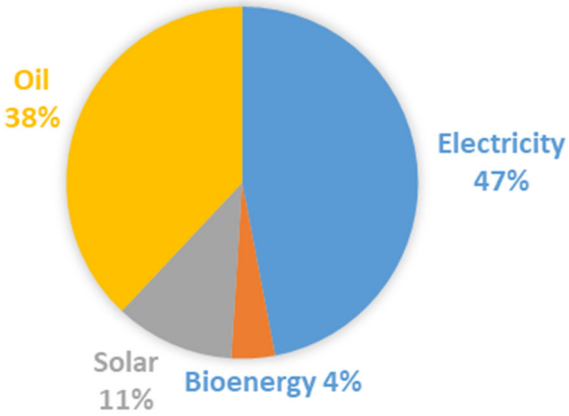

Figure 3. Final energy consumption in households by fuel type (2018).

2.4.2. EE Policy Landscape

Although EE is a national policy priority, implementation remains fragmented and under-resourced. Existing programs often focus on high-visibility interventions like photovoltaic (PV) installations or LED lighting, while passive retrofit measures—such as insulation, air sealing, and thermal upgrades—receive limited attention [38]. Passive retrofits are increasingly recognized as the most effective interventions due to their feasibility and superior energy savings. They align with the "efficiency first" principle, which prioritizes minimizing energy demand before upgrading active systems or integrating renewable energy technologies [43]. These measures not only stabilize indoor temperatures and enhance comfort but also offer a broader range of benefits compared to active EE strategies [44].

These passive approaches are essential for reducing base heating and cooling loads, but they require an upfront investment and consumer confidence that are often lacking in Jordan's market [45].

Several barriers might constrain the scale-up of residential retrofits in Jordan, whether economic, regulatory, institutional, or social. These barriers are not unique to Jordan. In fact, similar challenges were observed in developed countries during the early stages of their EE transitions. For instance, the UK Green Deal program, launched to stimulate household retrofits, failed to achieve significant adoption due to a poor design, financial complexity, and lack of trust [46].

2.4.3. Importance of Jordan as a Case Study

Jordan represents a strategically important case for examining retrofit BM innovation:

- It has urgent energy security needs [47];
- It features an underdeveloped yet active retrofit policy space [48];
- It exhibits barriers common to many developing markets, making it a proxy for broader Global South dynamics [20].

Studying Jordan's retrofit ecosystem through a PESTEL and BM framework allows for identifying targeted interventions that may be applicable across similar national contexts.

With this context established, the following section describes the data collection methods and analytical approach used to investigate the retrofit market in Jordan.

3. Methodology

This research adopts an exploratory case study approach, focusing on Jordan as a representative developing country with a significant energy import dependence [37]. The case study methodology enables the generation of in-depth insights into complex issues without pre-established hypotheses, aligning with the study's aim to explore barriers in an emerging market within the energy retrofit sector [49].

3.1. Research Steps

Semi-structured interviews were selected as the primary data collection method due to their ability to yield rich, non-numerical data [50]. These interviews targeted companies providing energy retrofit services in Jordan, aiming to gather detailed insights into both the companies' operation and the broader market challenges. The methodological process is summarized in Figure 4.

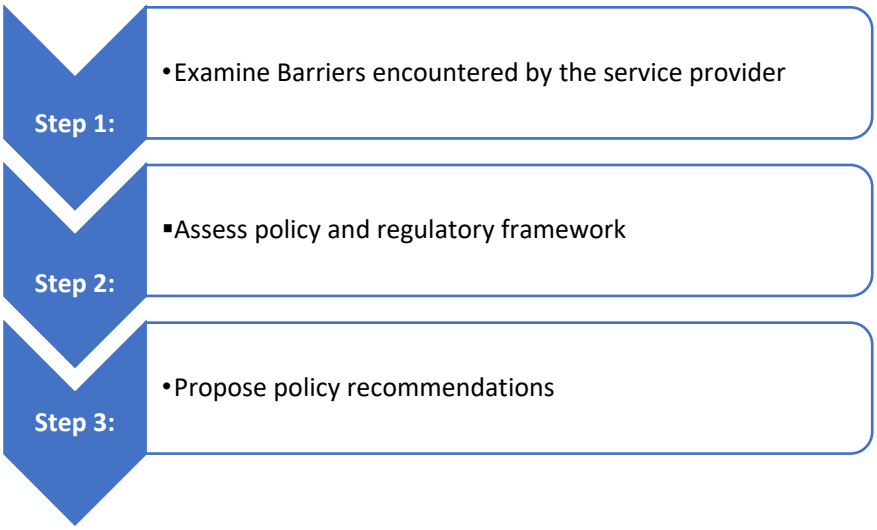

Figure 4. Research methodology.

The research followed a structured sequence:

- Step 1: Service Provider Barriers

  Identifying obstacles faced by service providers in implementing EE retrofits.
- Step 2: Policy and Regulatory Framework Examination

  Assessing existing policies and regulations for compatibility with OSS BMs.
- Step 3: Policy Recommendations

  Suggesting regulatory improvements to support BM innovation.

3.2. Participant Selection

This study focused on energy retrofit service providers rather than retailers of energy-efficient products. Service providers offer comprehensive solutions, including energy audits, custom retrofit plans, and ongoing support, whereas retailers focus on selling individual products like HVAC systems or LED lighting [51,52].

Participants were identified through desktop research, including industry websites, policy papers, and news articles. It was confirmed that only seven companies were active in the energy retrofit market in Jordan, with all agreeing to participate.

Importantly, this sample represents the entire population of relevant companies operating in Jordan's residential retrofit market, ensuring comprehensive coverage despite the limited number [53]. As Flyvbjerg [54] notes, a common misconception in case study research is that its validity depends on the sample size. In fact, the strength of qualitative inquiry lies in depth and contextual understanding, not statistical generalization [55]. As Bekele and Ago [56] emphasize, qualitative studies aim for thematic saturation, not numerical thresholds. As this study includes all seven companies currently active in Jordan's RER sector, it represents the full population, not a subset [57,58]. This ensures comprehensive coverage of the market actors and aligns with best practices in case study research.

3.3. Data Collection

Data collection occurred between May 2023 and January 2024, with interviews conducted with founders and executive managers to gather strategic-level insights.

The interview guide (Appendix A) was structured into two sections:

- Company Overview: Covering company history, services, target markets, and operational scope;
- Barrier Exploration: Open-ended questions aimed at uncovering market and operational barriers.

While the PESTEL framework was introduced, participants were encouraged to discuss barriers openly, allowing for richer data collection [59].

Initial telephone interviews were conducted to refine the guide, followed by in-depth, face-to-face interviews lasting up to two hours. Data were fully transcribed and anonymized, and participants were asked to recommend other companies, supporting snowball sampling. All participants provided informed consent, and interviews were conducted in accordance with institutional ethical guidelines.

The companies varied by size, service scope, and market focus. A profiling summary is provided in Table 1.

Table 1. Overview of interviewed companies.

Company	Industry	Services	Established	Interviewee	Employees	Area Served
1	Electromechanical, PV, Energy Management	Engineering consulting, PV (engineering, procurement, and commissioning) EPC, supply and install	2008	Founder	10–20	Regional
2	Energy Management, Environment, PV	Studies, PV EPC, supply and install	2008	Founder	20–30	Regional
3	Energy Management, Electromechanical, PV	Engineering consulting, PV EPC	2017	Founder	<10	Local
4	Electrical Equipment, Energy Management, PV	PV EPC, supply and install	2015	Partner/GM	>300	Regional
5	Energy Management, PV	PV EPC, supply and install	2023	GM	10–20	Local
6	Environment and Water, Food Security, PV	Studies, PV EPC	2009	Founder	10–20	Regional
7	Electrical Equipment, PV	PV EPC, supply and install	2014	GM	>10	Local

3.4. Data Analysis and Methodological Rigor

Data were analyzed using the PESTEL framework, categorizing barriers across six domains: political, economic, social, technological, environmental, and legal. This structured categorization facilitated a comprehensive assessment of both entry barriers and operational challenges [34].

Additionally, comparative analysis was applied to two particularly informative cases (Companies 1 and 2) to explore how macro-level PESTEL barriers manifest in distinct operational strategies. This helped identify patterns between external conditions and firm-level decisions [31,60]. Several strategies were used to enhance reliability and validity [55]:

- Triangulation: Interview data were cross-referenced with secondary sources, including policy documents and academic studies;
- External validity: Despite the small sample size, interviewing all relevant companies ensures theoretical generalizability within this context;
- Transparency: An audit trail documenting coding procedures and analytical decisions was maintained to support replicability.

4. Results

This study identified 27 distinct barriers faced by companies operating in Jordan's energy retrofit market. These barriers were systematically categorized using the PESTEL framework across six domains: political, economic, social, technological, environmental, and legal. Table 2 summarizes the barriers identified by the seven participating companies.

Table 2. PESTEL Analysis of barriers identified by energy retrofit service providers.

Barrier Category	Specific Barrier	Com.1	Com.2	Com.3	Com.4	Com.5	Com.6	Com.7	Total Mentions
Political	Lack of informed decision-making	✓	✓		✓		✓		4
	Donor-driven policy action	✓	✓			✓	✓		4
	Conflicting national political agendas	✓	✓	✓					3
	Lack of policy action	✓	✓		✓	✓			4
	Lack of public confidence in policy action	✓	✓		✓	✓	✓		5
	Lack of enabling policies	✓	✓	✓	✓		✓		5
Economic	End users lack capital/ access to finance	✓	✓	✓	✓	✓	✓		6
	Lack of competitive public–private financing schemes	✓	✓		✓			✓	4
	Audit service revenue losses	✓	✓	✓		✓			4
	Retrofit services risky, nonviable	✓	✓	✓	✓	✓	✓	✓	7
	Poor economy, businesses struggling	✓	✓	✓		✓			4
Social	Consumer lack of awareness	✓			✓	✓	✓		4
	Lack of willingness to pay		✓		✓	✓	✓		4
	Low perceived value of audits		✓	✓	✓	✓	✓		5
	Low confidence in expertise		✓	✓		✓			3
	Owner–tenant decision dilemma		✓	✓					2

Table 2. *Cont.*

Barrier Category	Specific Barrier	Com.1	Com.2	Com.3	Com.4	Com.5	Com.6	Com.7	Total Mentions
Technological	Lack of market expertise	✔			✔			✔	3
	High cost of services	✔	✔	✔	✔	✔	✔	✔	7
	Intangible service nature (difficult to perceive savings)	✔	✔	✔	✔	✔	✔	✔	7
Environmental	Failure of green building initiatives to drive residential market				✔				1
	Lack of expertise in bioclimatic design	✔							1
Legal	Lack of law enforcement	✔	✔	✔		✔	✔		5
	Lack of mandate/ governing framework	✔	✔	✔					3
	Lack of verification and regulatory clarity	✔	✔	✔	✔	✔	✔		6
	Lack of updated regulations	✔	✔		✔		✔		4
	Lack of expertise in regulatory bodies	✔	✔						2

4.1. Comparative Company Analysis: Correlational Insights

A comparative analysis revealed important differences in how companies perceive and experience barriers based on their history and market position:

- Companies 1 and 2, founded prior to the 2012 Renewable Energy and Energy Efficiency (REEE) Law [61], had greater involvement in shaping Jordan's early EE market regulations and participated in high-profile pilot projects. Their regulatory engagement gives them a unique understanding of policy and legal barriers. Their perspectives emphasized political, economic, and legal barriers more heavily;
- Companies 3–7, more recent entrants, emphasized a broader range of issues, including social and technological barriers, reflecting challenges faced by newer, smaller firms seeking market entry.

This divergence highlights how historical involvement in regulatory processes and market maturation stages influence stakeholder perceptions of systemic barriers.

The analysis also highlighted two major, cross-cutting barriers faced unanimously by all companies:

(1) Invisibility of Energy Retrofit Value

Service providers consistently reported that the benefits of energy retrofits—such as reduced energy bills or improved thermal comfort—are intangible and not immediately visible to consumers or decision-makers. Unlike renewable energy systems (e.g., rooftop PV systems), which offer easily observable outputs (e.g., kilowatt generation), retrofits provide diffuse benefits over time, making them harder to market.

This invisibility undermines both consumers' willingness to invest and policymaker support. This challenge is compounded by the fact that rooftop PV systems can offset nearly 100% of a household's energy consumption [61], diminishing the perceived necessity of investing in residential retrofits. As the interviewees noted,

"Jordan's energy policy has historically prioritized visible renewable technologies over less tangible efficiency gains."

While retrofits suffer from low visibility, this issue is exacerbated by donor-driven policies that have historically favored PV systems due to their measurable impact, sidelining less tangible EE measures. According to the interviewees,

"International donors have played a key role in driving renewable energy expansion, often to the detriment of EE initiatives. These donors channeled significant financial resources into renewables, sidelining EE policies and investments."

(2) Lack of a Feasible BM

Participants emphasized the absence of a viable business case to support comprehensive retrofits. Current service providers mainly deliver audit studies without implementation services or performance guarantees. As one of the interviewees argued,

"This energy audit-centric model offers limited standalone value, as customers often receive basic energy advice bundled with the purchase of equipment (e.g., HVAC systems), undermining the demand for separate professional audits."

The absence of a viable business case for standalone audit services was emphasized by all the participants. They described current BMs as weak and often unviable, especially in the residential sector. According to the interviewees,

"The lack of performance-based guarantees or bundled services contributes to the perception of audits as costly and ineffective."

These findings reflect systemic challenges that go beyond individual companies' capabilities and point to broader market and regulatory failures.

4.2. Systemic Barriers Shaping Retrofit BMs

The findings are focused on three primary barriers consistently identified by Companies 1 and 2: political, economic, and legal factors. These barriers were recurrent themes in the interviews and align with scholarly findings, highlighting them as key obstacles for market growth. Additionally, environmental barriers are explored, which were less emphasized but present specific challenges within the Jordanian market, offering a further insight into their impact on the energy retrofit sector.

4.2.1. Political Barriers

The political framework in Jordan plays a critical role in shaping the regulatory environment that governs the energy retrofit market. The findings from the interviews and policy review identified several political barriers that hinder the development of Jordan's energy retrofit market.

Jordan formally integrated EE into its national policy through the REEE Law in 2012, which came into effect in 2013 [61]. Interviewees indicated that current legislation primarily targets large-scale, non-residential sectors, particularly industrial and commercial facilities. Jordanian energy regulations cover equipment such as motors, pumps, ovens, and air compressors but offer limited provisions for residential energy services.

A review of post-2012 legislation confirmed these gaps. Only a small portion of directives explicitly support residential EE initiatives [62]. EE has been marginally addressed in only two out of eighteen directives published after 2012, indicating a lack of prioritization by national authorities.

Interviewees also reported that Jordan's energy strategies and annual reports do not articulate a clear political agenda to support EE market development. Instead, policy efforts have been directed primarily at expanding renewable energy initiatives. These initiatives

have benefited from international financing and donor support, which has helped position Jordan as a regional leader in renewable energy investment [63].

Political decisions are further affected by conflicting national agendas and a lack of public confidence in policy action. For instance, interviewees from Companies 1 and 2 observed that the introduction of EE services created tension between traditional renovation businesses and emerging energy retrofit providers. These conflicts contributed to regulatory uncertainty and called for clearer guidelines to ensure fair competition [64].

4.2.2. Economic Barriers

Economic barriers significantly inhibit the expansion of the energy retrofit market in Jordan. The participants identified several critical economic challenges that hinder the uptake of EE services, most notably the following:

(1) Lack of capital among end users;
(2) Insufficient public financing schemes;
(3) Limited access to commercial loans;
(4) High perceived risk of energy audit services without implementation guarantees.

Interviewees also highlighted how macroeconomic instability and a weak investment climate further suppressed demand. As one participant explained,

> *"Although the 2012 policy package, aimed to mobilize the market, economic constraints remained a major obstacle during the early stages of the policy's implementation."*

Despite these challenges, international aid was credited with playing a catalytic role in launching early EE market activity. Specifically, the USAID "Energy Sector Capacity Building" project (2015–2020) [65] was noted as a turning point. The project helped conduct energy audits in public buildings and large industrial facilities.

However, the participants noted a critical limitation of the program. As one interviewee described,

> *"Many industries that participated in the project allowed energy audits to be conducted but did not act on the recommendations due to the absence of economic or financial incentives. As a result, the visibility of EE initiatives was diminished."*

Following the conclusion of the USAID program, the market for audit services collapsed sharply. The participants linked this decline to the withdrawal of financial support and a lack of commercial financing pathways. Another noted,

> *"External funding schemes, particularly those from international donors, strongly influenced decision-making. Although international funding temporarily bolstered EE efforts, long-term adoption of EE recommendations slowed due to the lack of sustainable commercial financing options and the high risk of self-financing."*

Interviewees further suggested that the influence of donor agendas frequently outweighed the national policy direction, reinforcing short-term project cycles over sustainable market development [66]. These perspectives offer critical insights into the financial fragility of the EE market in Jordan.

4.2.3. Legal Barriers

The legal and regulatory framework in Jordan was consistently identified by participants as a key barrier to the development of the EE market. Several interrelated legal challenges emerged from the interviews, reflecting limitations in both the design and enforcement of the existing frameworks.

(1) Fragmented Legal Framework and Market Restriction

Before the 2012 REEE Law, service providers were permitted to deliver turnkey solutions. These included energy audits, retrofit designs, and equipment installation—often under performance-based contracts. This model enabled providers to develop viable service delivery BMs linked to energy savings. This model created a strong business case for firms by combining audit services with implementation [67].

However, the legal reforms introduced by the REEE Law redefined the sector's operating conditions. Under the current framework, companies are limited to providing audit studies only. The law does not legally recognize ESCOs that integrate audits with financing, implementation, and performance guarantees [15,68]. The participants stressed that this restriction reduces the value proposition of energy audits and creates a fragmented delivery model. One participant commented:

> *"While existing laws are well-defined, they are overly simplistic and fail to offer adequate mechanisms to stimulate investment, especially when compared to legislation supporting renewable energy."*

(2) Mismatch with Residential Sector Needs

The interviews revealed that the residential market is generally viewed as a challenging and less profitable area, primarily due to the high transaction costs associated with individual households [69].

Interviewees noted that households are more responsive to visible, comfort-related solutions rather than abstract audit reports. Building-envelope retrofit services—such as double glazing, wall retrofits, and thermal insulation—were highlighted by interviewees as a more viable solution for households addressing key household concerns related to energy consumption and comfort. These retrofits have greater potential for adoption within the residential sector [70].

Interview data revealed that the legal framework is misaligned with the specific needs of the residential market. While audit-based services may be suitable for industrial clients, they are not well-adapted to the economic and behavioral dynamics of households.

In addition, the absence of a supportive regulatory structure was identified as a key factor preventing households from investing in EE solutions. The lack of a clear framework heightens the perceived risks associated with such investments, making households hesitant to adopt energy-saving technologies.

Moreover, current laws and incentives favor renewable technologies. For example, the Jordan Renewable Energy and EE Fund (JREEEF) provides financing for low-income households to adopt specific energy solutions, such as solar water heaters, rooftop PV systems, and LED lighting [71], but doesn't equally prioritize EE retrofits. This policy orientation further sidelines EE services in the residential sector.

Other programs, such as the exchange of household appliances for more efficient models or the free distribution of LED lightbulbs, have seen minimal uptake. Interviewees noted that public distrust and skepticism regarding government programs, especially in a fragile economic context, contributed to the lack of participation [72]. Many households questioned the real intentions behind these initiatives, which further limited their effectiveness.

(3) Governance and Institutional Conflicts

The research also uncovers a lack of professional governance for energy audit firms, which exacerbates the challenges they face. No industry association exists to represent these companies, leaving them without adequate support. This governance vacuum contributes to an inconsistent service quality, low consumer trust, and an inability to coordinate market development.

Additionally, semi-government bodies, such as the Royal Scientific Society (RSS), compete directly with private firms through the National Energy Research Center (NERC), which conducts energy audit studies.

As argued by the interviewees,

> *"Since NERC receives preferential access to government and donor-funded audit contracts, private companies face significant disadvantages in a market already constrained by limited demand."*

However, the dominance of NERC in securing audit projects leaves little room for emerging businesses to survive in a market with limited opportunities. This uneven competitive landscape further hinders the market's development, reducing the effectiveness of energy audits as a tool for promoting EE across the country.

(4) BM Limitations under Current Law

This study found that the value propositions in current BMs, such as energy audits, are unsuccessful in addressing residential-scale projects. The nature of audit services, which are more compatible with larger-scale industrial or commercial energy management, does not align with the specific needs of residential customers.

Other common BM archetypes such as ESCOs also struggle to cater to the residential market, as they fail to account for the economic and social dynamics that affect individual households [28,73].

The current regulatory environment makes it impossible for companies to adopt ESCO-like BMs. Furthermore, energy audit-centric models are far more irrelevant to the performance-based contracts or the OSS models that are more suitable for scaling RER services. Table 3 summarizes the operational differences between audit-only companies and performance-based and OSS ones under Jordanian law.

Table 3. Audit companies vs. integrated OSS models using Brown's (2018) BM framework.

BM Component	Audit Companies (Jordan)	Integrated OSS/ESCO Model
1. Value Proposition	Focused on audit studies with limited perceived value for households.	End-to-end retrofit solutions tailored to user needs (e.g., comfort, savings, compliance).
2. Customer Interface	Limited customer support; interaction ends at audit report delivery.	Single point of contact for full service, including audits, design, finance, and implementation.
3. Supply Chain Integration	Fragmented; no linkage between audit findings and implementation services.	Bundled service delivery through coordinated partnerships or in-house teams.
4. Financial Model	Fixed fees or subsidized by equipment vendors; no performance guarantees.	Performance-based contracts; shared savings; facilitation of loans or subsidies.
5. Governance	No ESCO, performance-based, licensing; no industry body; competition from government actors like NERC.	Supported by legal frameworks that recognize OSS or performance-based roles, enabling fair competition and oversight.

Overall, the inability to bundle services, lack of clear legislation, and absence of regulatory support significantly hinder market scalability. Interviewees consistently described these legal constraints as critical bottlenecks that undermine their ability to offer integrated solutions and erode their long-term viability in the residential EE sector.

In conclusion, legal barriers in Jordan severely limit the ability of companies to offer comprehensive energy solutions. The fragmented market, lack of ESCO recognition, and competition from government bodies create a challenging environment for energy service providers.

4.2.4. Environmental Barriers

While environmental considerations are central to international climate funding agendas, they were notably underemphasized by most participants in this study. Interviewees rarely cited environmental concerns as primary drivers or barriers within Jordan's energy retrofit market. The prevailing perception among local actors is that economic constraints outweigh environmental priorities in retrofit decision-making.

Participants explained that environmental frameworks—such as those embedded in green building programs or LEED certification—are often seen as peripheral or burdensome rather than integral to projects' design. One participant noted that,

> *"These environmental considerations were often overshadowed by immediate economic concerns."*

This suggests a widespread tendency among stakeholders to prioritize economic over environmental factors when navigating the challenges of the retrofit market.

This reflects a significant discrepancy between national priorities and the guidelines that direct international financial allocations. The International Energy Agency has underscored this as a critical area requiring more focused attention [74]. Although environmental factors play a crucial role in the allocation of international climate funding [75], a segment of stakeholders continues to overlook their significance in shaping the energy retrofit market.

This lack of emphasis on environmental factors reflects a broader trend of minimal integration between EE strategies and sustainability-driven design. According to the interviews,

> *"Energy service providers tend to prioritize short-term cost-effectiveness over longer-term environmental impacts, especially in a weak economic climate."*

Moreover, the interviews revealed that the limited focus on environmental performance may hinder the uptake of advanced retrofit measures, such as bioclimatic building design or simulation-based modeling, which require a higher level of environmental expertise. In this regard, the under-representation of environmental concerns during interviews emerged not only as a missed opportunity but also as an indicator of a structural blind spot in current market and policy approaches.

5. Discussion

Jordan's energy policy currently focuses more on renewable energy investments, leaving EE underdeveloped. The country's EE market suffers from conflicting agendas and a lack of policy action, contributing to the absence of a strong legal framework to support ESCOs and energy audit services. These political barriers have created challenges for companies trying to scale their retrofit offerings, further impeding market growth.

In particular, the lack of visibility regarding retrofit benefits and the absence of comprehensive BMs offering bundled services were cited by all companies as critical constraints [20]. These findings mirror studies from Europe emphasizing that retrofit's value needs to be tangible and customer-oriented to drive adoption [13]. However, the literature supports the notion that policy levers are essential for driving EE market adoption by building end users' trust in services and facilitating collaboration with commercial banks [70].

While technological and social barriers (e.g., the service's intangibility, lack of willingness to pay) were acknowledged, they were secondary to economic and policy-related challenges. This prioritization suggests that improving the regulatory and financial environment is a prerequisite for scaling up technical solutions [76].

More broadly, environmental considerations remain under-addressed, with many stakeholders prioritizing economic feasibility over long-term environmental performance. Although green building programs exist, companies reported a lack of local expertise in bioclimatic design and simulation. This environmental knowledge gap limits the quality and ambition of EE interventions.

The findings of this study confirm that political, economic, and legal barriers are the most significant obstacles, consistent with previous research on emerging markets [77]. The subsequent sections will explore how these political barriers intertwine with economic and legal factors to shape the energy retrofit market in Jordan.

5.1. Political Framework Analysis

Policy action is fundamental in shaping market demand and encouraging investments in EE innovation. Jordan's political landscape presents notable policy gaps that hinder the effective market penetration of energy retrofits.

The misalignment of policies and regulatory gaps in Jordan's EE market are major factors impeding residential uptake of EE measures. These gaps are rooted in the broader governance framework that shapes decision-making in the energy sector. It requires targeted regulations, public programs, and sufficient budget allocations to support EE businesses. Understanding this framework is essential to assessing how it affects market operations, the adoption of innovative BMs, and the overall diffusion of energy-efficient solutions [78].

Our findings align with those of [9,20], who argue that regulatory frameworks in developing countries can inhibit the deployment of EE technologies. Similarly, Brown et al. [10] emphasize that addressing legal gaps is crucial for enabling EE's adoption in various contexts, including Jordan. For Jordan to realize its full EE potential, especially in the residential sector, policy reforms and market-driven solutions must be designed to address the unique barriers faced by households, while fostering greater public confidence and investment security.

The dominance of renewable energy solutions, coupled with a lack of trust in government programs, has created a challenging environment for promoting residential EE. Although Jordan formally integrated EE into its national agenda with the REEE Law in 2012, this legislation primarily focused on large-scale non-residential consumers [61].

These findings suggests that retrofits are consistently deprioritized in favor of more visible and measurable technologies such as rooftop solar PV systems. This lack of political prioritization, coupled with limited regulatory clarity, creates a disincentive for private sector investment in residential retrofit models.

The existing political frameworks, which currently impede the growth of a robust retrofit market, consist of various principles, guidelines, and regulations that dictate decision-making within the energy sector. Reforming these frameworks is crucial to expand retrofit services, as emphasized by [77].

5.2. Informed Decision-Making and Donor Influence

Political will plays a pivotal role in shaping energy policies and public interventions, which are essential for EE growth. Despite these challenges, policymakers must craft policies that account for the complexity of retrofits and promote their widespread adoption [79]. The literature supports the notion that policy levers are essential for driving EE

market adoption by building end users' trust in services and facilitating collaboration with commercial banks [28].

Political will can create an environment conducive to residential retrofits and foster investment from end users. However, the success of these efforts depends on the quality and reliability of the information available to policymakers, as well as their ability to balance competing agendas. Ultimately, informed decision-making is critical to the success of policy interventions in this sector.

One of the central barriers to the development of policy is the invisibility of retrofit's benefits, which are often diffuse and long-term compared to the immediate and visible outcomes of renewable energy systems. This has led to little political engagement and traction for developing retrofit-friendly regulations and incentives.

The rapid deployment of tangible RE solutions, such as rooftop solar PV systems, has boosted public confidence and political trust in renewables, further sidelining energy retrofits, whose benefits are less visible to end users and decision-makers alike.

This situation aligns with broader discussions in developing countries about the intangibility of EE as a key factor that obstructs decision-making and diminishes public willingness to invest in it [20]. Decision-makers in Jordan and similar contexts often prioritize visible, immediate results from RE over the longer-term, less tangible benefits of EE.

The situation is further complicated by the role of international donor funding that has often prioritized these initiatives over the development of robust EE policies [66]. This donor-driven approach has occasionally led to a misalignment between funded projects and Jordan's national energy priorities, limiting the growth of a more comprehensive EE framework.

5.3. Divergence Between Early Movers and New Entrants

The analysis of responses by Companies 1 and 2—both early market entrants—revealed a stronger sensitivity to political, legal, and financial frameworks. Their establishment prior to major regulatory reforms (i.e., the 2012 REEE Law [61]) allowed them to participate actively in shaping the sector's initial development. Their historical experience provided a deeper understanding of how weak governance and policy gaps hindered the expansion of EE services.

In contrast, newer entrants (Companies 3–7), with smaller market shares and less regulatory engagement, highlighted more immediate operational challenges, such as consumer awareness deficits and technological limitations. This difference underscores the role of institutional memory and regulatory involvement in shaping how market barriers are perceived and navigated.

Thus, the early movers' experience appears to offer a strategic advantage—both in navigating complex policy environments and in articulating sector-wide needs for market reforms. These findings align with broader business ecosystem theories emphasizing that firms with earlier engagement in the formation of policy tend to have a greater adaptive capacity in emerging sectors [80].

5.4. Implications for BM Innovation

The dominance of fragmented, audit-focused models in Jordan reflects a broader pattern of market underdevelopment. Without bundled service offerings, financial facilitation, and customer risk-sharing mechanisms, RER uptake remains limited.

The business case for energy audits was weakened following the implementation of the 2012 law, as companies were no longer able to offer services in alignment with their original BMs, leading to a significant drop in service feasibility.

Unlike ESCOs' BMs, which bundle audits with financing and implementation [81], Jordanian firms are legally restricted to audit-only services. This limits their ability to deliver performance-based models or guarantee savings. The lack of integration between energy assessments and retrofit implementation thus erodes the financial viability of retrofit businesses and limits sector growth.

While donor funding alleviated budgetary constraints—addressing a key economic barrier, Funding mechanisms preceded the development of a proper policy framework that could have established a more sustainable market.

This highlights the disconnect between international funding schemes and the long-term sustainability of Jordan's EE market, with participants noting that donors' influence in shaping the market is often greater than national policy frameworks.

International experience suggests that OSS models—which integrate audits, implementation, financing, and monitoring—can address these challenges by streamlining the customer journey and reducing transaction costs [10,35].

5.5. Strengthening Energy Linkages and Policy Relevance

A key insight emerging from the interviews is that Jordan's EE sector remains overshadowed by renewable energy programs, particularly solar PV initiatives. This emphasis on visible renewable technologies has sidelined investment in passive efficiency improvements—despite their critical role in reducing baseline energy demand [44,82].

Interviewees noted that international donor agendas often override national EE priorities, resulting in misaligned interventions that fail to build a lasting market capacity. To foster a balanced transition, national strategies must integrate EE retrofits with renewable deployment plans. This would align Jordan's RER market development with international best practices for comprehensive energy system decarbonization [83,84].

5.6. Conflicting Agendas and Legal Weaknesses

A further complication is the presence of conflicting national agendas within Jordan's energy and construction sectors. According to Companies 1 and 2, the introduction of retrofit services has at times created tensions with existing renovation service markets, where traditional contractors may view energy service providers as competitors. This has contributed to regulatory inertia, as policymakers attempt to balance competing interests without a unified legal framework. However, under the current legal framework, merging engineering design and implementation services under one entity is not permitted [64].

Additionally, the absence of a formal ESCO recognition framework further weakens the business case for retrofit providers. Jordanian energy service companies are legally restricted to providing audit services, unlike ESCOs in Europe, which can bundle financing and implementation with performance guarantees [83]. Without legal reform to support performance-based contracting and integrated services, Jordan's retrofit sector is likely to remain fragmented and underdeveloped.

This conflict of interest stifles market competition and impedes the growth of private enterprises within the EE sector [60].

5.7. Environmental Linkages

Although environmental factors play a crucial role in the allocation of international climate funding [74], a segment of stakeholders continues to overlook their significance in shaping the energy retrofit market.

While environmental barriers are key to determining the best available technologies for improving EE—as emphasized in the literature [85,86]—they were largely neglected by the companies involved in this study.

Programs designed to improve EE in buildings, such as those promoting green buildings and LEED certification, typically stipulate that recipients of international funding engage professionals skilled in environmental design [87]. These requirements aim to ensure that projects not only meet high EE standards but also contribute positively to environmental sustainability.

This reflects a significant discrepancy between national priorities and the guidelines that direct international financial allocations. The International Energy Agency has underscored this as a critical area requiring more focused attention [3].

This omission reflects the bias toward immediate financial concerns over long-term environmental impact, which needs to be addressed to foster a more balanced and sustainable approach to EE in Jordan and beyond [62].

6. Policy Implications

For Jordan's EE market to grow, there must be significant regulatory reforms that address these issues, allowing for more integrated and scalable BMs that can meet the country's EE goals.

6.1. Strengthening Regulatory Frameworks

Effective legislation is often a catalyst for overcoming market barriers, yet the absence of a legal framework that supports ESCO licensing limits the market's potential for growth. Without such regulation, the BM for many companies fails to thrive.

Jordan's current energy policies, while progressive in supporting the deployment of renewable energy, insufficiently prioritize residential EE initiatives. The following recommendations could support rebalancing the policy landscape:

- Mandatory retrofit standards should be introduced for existing residential buildings, linked to national EE targets;
- Performance-based contracting frameworks must be legally recognized and regulated, creating an enabling environment for ESCOs and comprehensive retrofit providers;
- Clear governance structures separating regulatory authorities from market competitors (e.g., public audit service providers) are essential to ensure fair market conditions.

These measures would signal a stronger political commitment to EE, enhance investor confidence, and stimulate market entry.

6.2. Expanding Access to Financing Mechanisms

Audit service demand rose briefly during the USAID Energy Capacity Building project but collapsed post-2015. This demonstrates the fragility of donor-dependent BMs without sustainable financing.

Economic barriers—including limited access to affordable financing—remain among the most significant obstacles to retrofit uptake. Public financing programs such as JREEEF should undertake the following:

- Transition from isolated subsidy models toward integrated retrofit-financing platforms, bundling technical assessments, financing, and service delivery;
- Facilitate low-interest loans, green mortgages, and targeted grants specifically for middle- and lower-income households;

- Encourage private sector financing through risk-sharing mechanisms, such as loan guarantees for energy retrofits.

By increasing financial accessibility, these reforms would create incentives for both providers and consumers to invest in deep retrofits rather than isolated interventions.

6.3. Supporting BM Innovation

Given the lack of viable BMs beyond energy auditing, policy must explicitly encourage the evolution of comprehensive retrofit service models. Recommended actions include the following:

- Promoting the OSS model as a national delivery platform, integrating audits, financing, implementation, and monitoring;
- Offering technical assistance and market entry support for companies transitioning from fragmented service provision to integrated delivery models;
- Facilitating the certification of service quality standards through international schemes like EDGE or ISO 50001 [86] to build consumer trust.

Such support would allow companies to move beyond audit-only services toward delivering measurable, performance-guaranteed retrofit outcomes.

6.4. Enhancing Consumer Awareness and Trust

Low consumer awareness of EE's benefits and skepticism toward retrofit investments continue to undermine demand. Therefore, the following should be considered:

- National EE awareness campaigns should shift the narrative from upfront costs to lifecycle savings, comfort, and property value gains;
- Endorsement by trusted institutions, municipalities, or financial institutions would increase credibility;
- Demonstration projects targeting middle-class residential neighborhoods could serve as tangible evidence of retrofit's benefits, enhancing visibility and social proof.

Embedding consumer engagement strategies into policy initiatives will help address behavioral barriers and drive market uptake.

6.5. Encouraging Public–Private Collaboration

Finally, public–private partnerships (PPPs) should be leveraged to pilot and scale integrated retrofit delivery models. The government can play a catalytic role by undertaking the following:

- Co-financing OSS platforms;
- Facilitating data sharing and market intelligence;
- Offering outcome-based incentives tied to energy savings.

Structured PPPs can align incentives across market actors, de-risk innovation, and enable the mainstreaming of retrofit solutions at scale.

A comprehensive policy package combining regulatory reform, financial innovation, market support, and consumer engagement is essential to unlock Jordan's retrofit potential. These reforms, grounded in OSS principles, would not only advance Jordan's national energy goals but also offer a replicable framework for other emerging economies navigating similar barriers (Table 4).

Table 4. Policy recommendations for scaling RERs in Jordan.

Category	Policy Recommendations	Implication
Regulatory Frameworks	Introduce mandatory retrofit standards. Establish legal frameworks for performance-based contracts. Separate regulatory authority from market actors.	Strengthen market confidence. Enable integrated service models.
Financing Mechanisms	Expand low-interest loans and grants. Launch integrated retrofit financing platforms. Create risk-sharing mechanisms for private banks.	Improve access to capital. Boost retrofit investments.
Business Model Support	Promote OSS-based service delivery. Provide technical assistance for service integration. Standardize service quality certifications (e.g., EDGE, ISO 50001).	Facilitate business innovation. Improve service reliability.
Consumer Awareness	Launch national EE awareness campaigns. Highlight lifecycle savings and comfort benefits. Implement demonstration projects.	Build trust. Increase consumer demand for retrofits.
Public–Private Partnerships	Co-finance OSS pilots. Share market data and intelligence. Provide performance-based incentives.	Align stakeholder incentives. Accelerate market transformation.

7. Conclusions

This study explored the barriers facing BM innovation for RERs in Jordan, using a combined PESTEL and BM framework to diagnose structural challenges in the emerging market. Despite national policy commitments and a growing energy demand, Jordan's RER sector remains underdeveloped, constrained by regulatory gaps, fragmented service delivery models, financing limitations, and low consumer awareness.

The findings revealed that political, economic, and legal barriers dominate the landscape, while environmental concerns—critical to sustainable energy transitions—are underrecognized. In particular, the absence of enabling legislation for ESCOs, the fragmentation between audit services and the implementation of retrofits, and the donor-driven nature of market development have stunted the evolution of integrated, scalable retrofit solutions. Residential EE remains marginalized within broader national energy priorities, with transaction costs and trust deficits further inhibiting uptake.

By synthesizing market actor insights and aligning them with theoretical frameworks, this study proposes a roadmap for transformation of the sector. Core recommendations include legal reforms to enable performance-based contracting, tailored financing mechanisms for households, separation of governance from service delivery, and greater integration of environmental sustainability objectives into national strategies.

While this research focused on Jordan, the findings have broader relevance for other developing economies with similarly fragmented EE markets. Addressing external barriers and fostering BM innovation are critical for scaling residential retrofits and achieving meaningful energy and climate targets.

Future research should expand empirical studies across diverse contexts, test the operationalization of OSS models in emerging markets, and explore the longitudinal impacts of regulatory and market reforms on RER's adoption.

Limitations and Directions for Future Research

This study is subject to certain limitations. First, qualitative interviews, although rich in detail, may reflect participant biases or selective perspectives. Triangulation with policy

documents and market reports was used to mitigate this, but future studies could enhance their robustness through mixed-methods approaches.

Second, the sample focused exclusively on companies operating in Jordan's RER market. While this study captured the full population of relevant firms, broader comparative studies across multiple developing countries could enrich the generalizability of its insights.

While the PESTEL framework provided a structured lens for macro-environmental analysis, its descriptive nature required theoretical supplementation to deepen the explanatory power of our findings.

Lastly, future research could integrate additional tools (e.g., fuzzy cognitive maps or system dynamics modeling) to better capture the complexity and interdependence of barriers in dynamic markets.

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Abbreviations

The following abbreviations are used in this manuscript:

EE	Energy efficiency
RER	Residential energy retrofit
BM	Business model
OSS	One-Stop Shop
SDG	Sustainable Development Goal
IEA	International Energy Agency
IPCC	International Panel on Climate Change
GHG	Green House Gas
PESTEL	Political, economic, social, technological, environmental, and legal
BMC	Business model canvas
PV	Photovoltaic
HVAC	Heating, ventilation, and air conditioning
EU	European Union
UK	United Kingdom
SME	Medium-sized enterprises
JREEEF	Jordan Renewable Energy and Energy Efficiency Fund
ESCO	Energy service company
ESPC	Energy service provider company
ESP	Energy service provider

Appendix A

Appendix A.1 UTS HREC REF NO. ETH22-7319

Interview Guidelines

- Background

The slow progress in energy efficiency in the residential sector is a global challenge. Despite policy action, neither governments' programs nor public funding has succeeded in scaling up the uptake, even among developed states with the most developed markets.

- Our definitions:
  - In the context of the energy efficiency market, energy efficiency services are upgrades made for homes to minimize the waste of energy and enhance the efficiency of the energy used in these homes;
  - PESTEL is a strategic analysis framework, where the acronym refers to political, economic, social, technological, environmental, and legal. The framework is used to analyse and rank barriers within the business environment. It aims to help develop innovative services and new business models to initiate in the market (how the business is happening and what can be improved to further develop the market).
- Two main objectives of this work:
  - 01. To understand the energy efficiency services market in Jordan and the process through which the market vehicle is delivering these services: meeting ESCOs' representatives, characterising the participants, their roles, their knowledge, their business models, their services, the service delivery process flaws, and what is the market uptake among households;
  - 02. To explore the market barriers hindering the uptake of residential energy efficiency services in Jordan: what is their perspective on barriers that are slowing down households from acquiring these services, how do they rank these barriers, as well as what could be changed within how the business is happening and within the market vehicle to further develop the market in the future.

Key questions—First part (semi-structured interview)

Hi, thanks for giving us the time to meet today. . .

As you know, we would like to interview you given your expertise and your company's experience in the energy efficiency services market.

So, first. . .

1. Can you describe your experience in the market, your background, and your role in your company, as your company is one of the officially registered energy audit companies (energy service company) in Jordan?
   a. Probe: what is your occupation, academic qualification and certifications, your experience within and beyond your company, and when was your company registered?
   b. So, how long have you been in the market? What is your past experience?

The 2013 law has obliged large entities (mainly industrial and government facilities) to conduct energy audits. This has mobilized the energy efficiency services market for certain sectors. . .

But let's talk about energy efficiency services in the residential sector in particular. And by this, I am referring to services. . .

As you know, energy efficiency services are upgrades made for homes to minimize the waste of energy and to enhance the efficiency of the energy used in these homes.

In a couple of minutes...

2. Can you tell us if you have dealt with residential projects in the past?
    a. Probe: Can you give an example of a residential project you completed? In a couple of sentences, can you describe the service within this project?

(Discrepancies might appear: for example—Ok, but this is not residential...)

    b. Are residential audits common projects for your company? Do these projects represent a considerable part of your activity?

Key questions—Second part (semi-structured interview)

From your experience and practice in the energy efficiency services market...

1. What do you see as the biggest barrier to residential energy efficiency investment uptake in Jordan?
    a. Probe: What are the main barriers that are hindering households from taking up energy efficiency services?

So, besides talking about political issues and economic issues that challenge you in doing your business, let's talk about the people.

What do the people say as key issues they have and whether they are knowledgeable when you talk about it...

1. What are the barriers that are the most influential in their decision to acquire these services? Which one do you think is the biggest one? Is it an upfront cost? Is it knowledge? Which one of them? Ordering them in order of preference?
    a. Probe: Can you rank the most relevant three barriers in order of importance?
2. Can you describe the knowledge of potential clients around energy efficiency services, and whether they know about the solutions that you are proposing or are keen on understanding them?
    a. Probe: Is their decision primarily based on the lowest price?

In terms of current business models:

1. What do you think the best business model for residential energy efficiency in Jordan would look like?
    a. Probe: What elements can be changed or added in what they do that can help stimulate the market? What opportunities can they grasp?
2. What aspects of the way the energy efficiency business vehicle is running and delivering services to households can be changed to further develop the market in Jordan?
    b. Probe: What aspects of the way the business is currently happening in the market have the major influence on slowing down the residential uptake of energy efficiency services?

Closing

Is there anyone else you'd recommend that we speak to who'd add additional valuable insights? (Name, organization, email, telephone number)

Interviews Checklist:

- Call—Talk about things, recent UN progress reports;
- Ask them to provide support to you as a researcher in better understanding this issue;
- Make them feel comfortable to talk;
- Gather some preliminary information;
- Email them with a brief introduction about what this interview is about;
- Review the questions;

- Schedule the meeting;
- Take the questions sheet;
- Provide the consent form beforehand;
- Bring two copies of the consent form;
- Sign the two copies and get your copy signed by both parties.

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