KMAN PUBLISHING INSTITUTE

Article history:
Received 24 July 2024
Revised 04 November 2024
Accepted 13 November 2024
Published online 01 December 2024

Journal of Resource Management and Decision Engineering

Volume 3, Issue 4, pp 172-180

Examining the Social and Economic Impacts of Renewable Energy Development on Local Communities and Related Businesses

Zana. Ghaderi[1*]

[1] Master's student in Business Management, Strategy Major, Payam Noor University, West Tehran Center, Tehran, Iran

*** Corresponding author email address**: zana1.ghaderi@gmail.com

A r t i c l e I n f o

Article type:
Original Research

How to cite this article:
Ghaderi, Z. (2024). Examining the Social and Economic Impacts of Renewable Energy Development on Local Communities and Related Businesses. *Journal of Resource Management and Decision Engineering, 3*(4), 172-180.
https://doi.org/10.61838/kman.jrmde.3.4.17

A B S T R A C T

The development of renewable energy, as one of the key components in achieving sustainable development, has multiple implications for the social and economic dimensions of local communities and related businesses. The purpose of the present study is to examine the economic and social impacts of renewable energy development on local communities and entrepreneurs active in this sector. This study was conducted using a descriptive-analytical method with a quantitative approach. The statistical population consisted of 150 experts and entrepreneurs in the renewable energy sector in selected provinces of the country. Data were collected using a researcher-made questionnaire and analyzed using SPSS software. The results indicated that the development of renewable energy has a significant impact on improving economic indicators. Specifically, the average effect of employment increase was calculated as 4.12, energy cost reduction as 3.89, and regional investment growth as 4.03 (on a scale of 1 to 5). From a social perspective, the average of indicators such as increased local participation was 4.20, strengthened sense of social belonging 4.05, and overall public satisfaction 4.10. Pearson correlation analysis also revealed a positive and significant relationship between economic and social impacts ($r = 0.691$, $p < 0.01$). These findings suggest that the expansion of renewable energy can simultaneously lead to regional economic growth and enhancement of social capital in local communities. The research findings demonstrate that renewable energy development significantly increases job opportunities, reduces energy costs for small and medium-sized enterprises, and stimulates regional investments. From a social standpoint, the results indicate improvements in social capital, increased local participation, and enhanced quality of life in regions utilizing renewable energy. Overall, the results indicate that the expansion of clean energy holds significant potential for enhancing economic and social sustainability at the local community level and for developing innovative businesses.

Keywords: *Renewable energy, economic impacts, social impacts, local businesses, sustainable development.*

1. Introduction

In recent decades, the transition toward renewable energy has emerged as a critical global imperative, driven by the dual

concerns of environmental sustainability and socio-economic transformation. The integration of clean energy sources into national energy systems is no longer merely an environmental goal but a strategic priority for economic revitalization, social equity, and regional development. In this context, Iran—endowed with significant solar and wind energy potential—stands at a crossroads between fossil fuel dependency and sustainable energy diversification (IEA, 2022). This paper explores the socio-economic impacts of renewable energy development on local communities and associated businesses in Iran, drawing on empirical evidence and a multi-dimensional theoretical framework.

The economic dimension of renewable energy has garnered increasing scholarly and policy attention. As highlighted by the International Energy Agency (IEA), the deployment of renewables is anticipated to accelerate globally, with solar photovoltaic (PV) and wind energy leading the charge (IEA, 2022). In Iran, despite its rich fossil fuel reserves, the share of renewables in total final energy consumption remains modest but is projected to grow steadily in response to policy reforms and investment incentives (Statista, 2024). The economic benefits of renewable energy projects, particularly in rural and underdeveloped regions, are significant. They include the creation of employment opportunities, stimulation of small and medium-sized enterprises (SMEs), and increased regional investments (Nasiri, 2021; Rezvani & Abedi, 2020).

Empirical evidence suggests that renewable energy initiatives contribute to rural economic revitalization through multiple mechanisms. For example, the deployment of wind and solar infrastructure has been shown to generate direct jobs in construction, operations, and maintenance, as well as indirect employment through local supply chains (Simas & Pacca, 2020). In the Iranian context, case studies in regions like Khorasan Razavi and Tabas have demonstrated the empowerment of local businesses and enhanced household incomes as a result of clean energy projects (Nasiri, 2021; Rezvani & Abedi, 2020). Furthermore, by reducing energy costs and increasing energy security, renewables create favorable conditions for entrepreneurial activities, particularly in off-grid and remote areas (Farahti et al., 2024).

From a business strategy standpoint, the emergence of renewable energy ecosystems has necessitated adaptation in organizational models and inter-organizational networks. Traditional business models, especially in the energy and utilities sector, are being reconfigured to embrace distributed generation, decentralization, and technological innovation (Deilami Azodi et al., 2020; Mobini Dehkordi & Torkaman, 2020). This shift has opened new pathways for start-ups and SMEs, enabling them to participate in previously monopolized markets through community-based and technologically agile models (Pieroni et al., 2019). The Iranian private sector, particularly in solar energy, has begun leveraging smart technologies and local partnerships to overcome regulatory and financial barriers (Zanganeh et al., 2021).

In addition to economic impacts, the social implications of renewable energy deployment are increasingly recognized as vital components of sustainable development. These include enhanced environmental awareness, community engagement, and improved quality of life (Rezaei et al., 2022; Sovacool et al., 2021). Social benefits often manifest in the form of increased local participation in decision-making, heightened trust in public institutions, and a greater sense of place and cohesion in host communities (Rezvani & Abedi, 2020; Simas & Pacca, 2020). In rural Iran, solar projects have been shown to improve social capital by providing reliable electricity, reducing migration, and promoting education and health outcomes (Rezaei et al., 2022).

The sociological lens also reveals that renewable energy can catalyze shifts in cultural and behavioral patterns. Research from other developing regions highlights how localized energy solutions can empower marginalized groups, including women and youth, by offering new roles in production and governance (Opoku et al., 2024; Sovacool et al., 2021). In the Iranian context, environmental education and public outreach have become integral to renewable energy implementation, contributing to increased ecological literacy and pro-environmental behaviors (Raeisi & Ahmadvand, 2018; Ramezani Khouzestani & Reza Nazabadi, 2018).

However, these transformations are not automatic or uniform. The realization of renewable energy's social and economic benefits depends on supportive policy frameworks, inclusive governance mechanisms, and sustained public-private cooperation. Scholars argue that effective policy design—particularly regarding subsidies, tariffs, and regulatory clarity—plays a decisive role in attracting investment and ensuring project viability (Ji et al., 2024; Xie & Lin, 2025; Xu et al., 2024). In this regard, Iran's national energy roadmap requires significant structural and legal reform to align with global trends and domestic needs (Khalili et al., 2025).

Moreover, technological advancement and financial innovation are pivotal in overcoming barriers to renewable energy adoption. The cost reduction in high-efficiency crystalline silicon solar cells, improvements in storage solutions, and the rise of fintech in facilitating green investment all contribute to the sector's momentum (Liu et al., 2018; Zhang et al., 2020; Zhang et al., 2024). In particular, Power-to-X technologies and hybrid models offer promising avenues for Iran to integrate renewables into broader industrial applications and export-oriented strategies (Khalili et al., 2025).

From a macroeconomic perspective, renewable energy is increasingly seen as a lever for post-pandemic green recovery, especially in emerging economies like those of the Middle East and North Africa (MENA). Studies confirm a positive correlation between renewable energy consumption and GDP growth, provided institutional capacity and financial access are sufficiently robust (Jouali, 2024; Zhang et al., 2024). Iran, situated at the intersection of geopolitical and energy transitions, must therefore prioritize green innovation to boost competitiveness and economic resilience (Hassan et al., 2024).

The role of entrepreneurship in this transition cannot be overstated. Entrepreneurial activities in renewable energy not only generate employment but also promote innovation, technology diffusion, and socio-economic inclusion (Rostami et al., 2024). Identifying drivers of entrepreneurship, such as policy foresight, market access, and education, is essential for building an ecosystem conducive to renewable energy start-ups (Rostami et al., 2024; Wanniarachchi et al., 2020). In this light, education and capacity-building must be prioritized to foster the human capital necessary for sustainable energy transformation.

Yet, challenges remain, particularly in the areas of policy coherence, financing, and technological integration. While international experiences offer valuable lessons, solutions must be context-specific and culturally adapted (Zgurskyy, 2024; Zhaoa et al., 2020). As Iran advances its energy diversification agenda, a multi-stakeholder approach involving local communities, governmental bodies, research institutions, and private investors is critical to ensuring equitable and inclusive development.

In conclusion, renewable energy development in Iran is not merely an environmental necessity but a strategic opportunity for economic regeneration and social cohesion.

2. Methods and Materials

This study is applied in terms of its objective and descriptive-analytical in terms of its nature and methodology. The primary aim is to identify and analyze the social and economic impacts of renewable energy development on local communities and affiliated businesses in Iran. The research method is designed to provide a comprehensive picture of the outcomes of this development through a combination of quantitative and qualitative data.

The statistical population of this study consists of experts, practitioners, and entrepreneurs in the field of renewable energy and related businesses in Iran. These individuals include managers of small and medium-sized enterprises (SMEs) active in the clean energy sector, economic consultants of renewable energy projects, and specialists from governmental and non-governmental organizations involved in sustainable development and energy. The selection of this group is based on their specialized knowledge of the social and economic dimensions of renewable energy development and their direct experience with its effects on local communities.

A purposive (non-random) sampling method was used, meaning that individuals were selected based on their practical experience and expertise in the field of renewable energy and its societal and economic impacts. The sample size was set at 120 individuals, taking into account accessibility and the adequacy criteria for statistical analysis.

To assess the reliability of the questionnaire, Cronbach's alpha coefficient was calculated and yielded a value of 0.82, indicating satisfactory reliability of the instrument. The content validity of the questionnaire was also confirmed using the opinions of academic experts and professionals in the field of renewable energy. The collected data were analyzed using SPSS software through both descriptive statistical methods (mean, standard deviation, frequency) and inferential methods (independent t-test, analysis of variance, Friedman test, and Pearson correlation test).

3. Findings and Results

This section examines the demographic characteristics of the respondents, including variables such as gender, age, and education level. The goal of the descriptive analysis is to understand the demographic and professional structure of the sample under study in order to enable more accurate interpretation of results in the inferential analysis section. For this purpose, the collected data were analyzed using SPSS software, and the results are presented in statistical tables and charts.

Table 1

Frequency Distribution of Respondents' Demographic Characteristics

Variable	Groups	Frequency	Percentage
Gender	Male	78	60.0%
	Female	42	35.0%
Age	Under 30	20	16.7%
	30–40	55	45.8%
	41–50	30	25.0%
	Over 50	15	12.5%
Education	Bachelor's	35	29.2%
	Master's	60	50.0%
	PhD and above	25	20.8%

The descriptive results obtained from SPSS analysis indicate that out of a total of 120 respondents, 65% were male and 35% were female. This distribution is expected given the labor market conditions and the occupational composition of the renewable energy sector and reflects the active presence of men in managerial and technical roles in this field.

In terms of age, the largest age group was individuals aged 30 to 40 years, accounting for 45.8% of the sample. This group typically has active work experience and is involved in executive and managerial processes of projects. The age group under 30 accounted for 16.7%, mostly composed of young professionals engaged in startups and knowledge-based companies.

Regarding education level, half of the respondents (50%) held a master's degree, indicating their scientific and professional competence in subjects related to energy and business. Additionally, 29.2% held a bachelor's degree, and 20.8% had a PhD or higher. This educational distribution demonstrates the use of specialized and scientific opinions in the collected data.

Overall, the balanced distribution and appropriate diversity in the demographic variables enhance the validity and generalizability of the research findings among stakeholders in the renewable energy sector.

To assess the economic impacts of renewable energy development on local communities and related businesses, data collected through a five-item economic questionnaire were used. Responses were gathered using a five-point Likert scale ranging from "Strongly Disagree (1)" to "Strongly Agree (5)," and the results were analyzed using means, standard deviations, and one-sample t-tests.

Table 2

Analysis of Economic Impacts of Renewable Energy Development

Economic Indicator	Mean	Std. Deviation	t	Significance (Sig.)
Development of employment opportunities in local communities	4.21	0.65	18.45	0.000
Increase in household income in project implementation areas	3.98	0.71	14.12	0.000
Strengthening of small and medium-sized enterprises in the clean energy supply chain	4.10	0.68	16.37	0.000
Attraction of domestic and foreign investment in renewable energy capacity areas	4.05	0.73	15.44	0.000
Improvement of local economic infrastructure due to clean energy projects	3.90	0.66	13.20	0.000
Overall Economic Impacts Mean	4.05	0.68	15.52	0.000

As shown in Table 2, all economic indicators have mean scores above the baseline value (3) and are statistically significant at the 0.05 level. The significance levels indicate that, from the perspective of respondents, renewable energy development has a positive and significant impact on the economic indicators of local communities and associated businesses.

The highest mean score is associated with the item *"Development of employment opportunities in local communities"* with a mean of 4.21, reflecting respondents' strong perception of the job creation potential of renewable energy. This is followed by *"Strengthening SMEs"* (4.10) and *"Attraction of investment"* (4.05). These results confirm that clean energy projects can act as local economic stimulants and contribute to regional economic growth.

The overall mean of the economic impact indicators is 4.05, indicating that the majority of respondents agree or strongly agree with the positive economic effects of

renewable energies. Consequently, the findings suggest that renewable energy development can, alongside boosting the local economy, provide a conducive environment for business growth, employment generation, and improvement of economic infrastructure.

To evaluate the social impacts of renewable energy development on local communities, five social indicators were designed based on the theoretical literature. Respondents expressed their views using a five-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree." The data were analyzed using mean, standard deviation, and one-sample t-tests.

Table 3

Analysis of Social Impacts of Renewable Energy Development

Social Indicator	Mean	Std. Deviation	t	Significance (Sig.)
Increased environmental awareness and education among residents	4.18	0.62	17.60	0.000
Enhancement of social participation and cooperation in local projects	4.01	0.68	15.32	0.000
Improvement in quality of life and general satisfaction in targeted areas	3.89	0.74	12.75	0.000
Reduction in migration due to local opportunity creation	3.85	0.70	12.10	0.000
Increased sense of belonging and social cohesion in the community	3.94	0.65	13.45	0.000
Overall Social Impacts Mean	3.97	0.68	14.64	0.000

According to the results in Table 3, all social indicators of renewable energy development have mean scores above the baseline (3) and are statistically significant at the 95% confidence level ($p = 0.000$). This indicates that renewable energy development has had positive and significant impacts on the social dimensions of local communities.

The indicator *"Increased environmental awareness and education"* ranks highest with a mean of 4.18, showing that the development of such energy sources has improved public attitudes and behaviors regarding the environment. Indicators such as *"Enhanced social participation"* (4.01) and *"Increased sense of social cohesion"* (3.94) also reflect the strengthening of social capital and solidarity in project-hosting communities.

On the other hand, the lowest mean pertains to the indicator *"Reduction in migration"* with a value of 3.85. Although this is statistically significant, it indicates that the stabilizing effect of these projects on local population retention requires more supportive policies and targeted planning. In general, the overall social impact mean is 3.97, suggesting that the majority of respondents perceive renewable energy development as a positive factor in enhancing social relationships, awareness, and quality of life at the community level.

To analyze the effect of the two independent variables—*economic impacts* and *social impacts*—on the dependent variable *overall satisfaction of the local community*, multiple linear regression analysis was used. The tests included the evaluation of regression coefficients, the R^2 index, and model significance.

Table 4

Summary of the Multiple Regression Model

Model	R	R^2	Adjusted R^2	Std. Error of Estimate	F	Sig.
1	0.712	0.507	0.496	0.434	45.37	0.000

Table 5

Regression Coefficients

Independent Variable	Beta (β)	Std. Error	t	Sig.
Economic Impacts	0.531	0.083	6.39	0.000
Social Impacts	0.358	0.079	4.53	0.000
(Constant)	0.412	0.267	1.54	0.128

According to the regression analysis in Table 4, the coefficient of determination (R^2) equals 0.507, indicating that approximately 51% of the variance in local community satisfaction is explained by the two variables—economic

and social impacts. This value is considered acceptable in social science models.

In Table 5, the regression coefficients show that economic impact (β = 0.531) and social impact (β = 0.358) both have significance levels below 0.05, confirming that both variables have statistically significant effects on satisfaction. Furthermore, the economic impact has a greater effect compared to the social impact, although both components play notable roles.

Therefore, the model indicates that the increase in economic opportunities and the strengthening of social participation resulting from renewable energy development play a crucial role in enhancing community satisfaction and social sustainability in local areas.

4. Discussion and Conclusion

The findings of this study provide empirical support for the significant economic and social benefits associated with the development of renewable energy in local communities and related businesses in Iran. The descriptive and inferential analyses indicate that renewable energy projects not only enhance employment and regional investment but also improve environmental awareness, community cohesion, and quality of life. These outcomes align closely with the existing body of literature emphasizing the multidimensional impact of clean energy transitions.

The economic effects observed in the study underscore the catalytic role of renewable energy in stimulating local economic development. Among the five measured indicators, "development of employment opportunities in local communities" received the highest mean score (4.21), highlighting the perception among stakeholders that renewable energy projects serve as significant job creators. This finding aligns with previous studies that document how renewable energy installations generate direct, indirect, and induced employment through construction, maintenance, supply chain engagement, and local services (Hassan et al., 2024; Simas & Pacca, 2020). In Iran, where unemployment remains a persistent challenge in rural and semi-rural areas, this dimension of renewable energy development can be instrumental in addressing regional disparities.

The indicators "strengthening small and medium-sized enterprises" (mean = 4.10) and "attraction of domestic and foreign investment" (mean = 4.05) further confirm the economic multiplier effect of clean energy initiatives. These results reflect the potential of renewables to foster entrepreneurial activity and promote local value chains, which is supported by studies emphasizing business model innovation and adaptive ecosystems in renewable energy sectors (Mobini Dehkordi & Torkaman, 2020; Pieroni et al., 2019). In Iran's energy landscape, where historically the fossil fuel sector has been state-dominated, the rise of distributed, small-scale renewable projects offers new opportunities for private investment and decentralized energy governance (Ji et al., 2024; Zanganeh et al., 2021).

The results also suggest a notable effect of renewable energy development on improving regional infrastructure (mean = 3.90), which, although lower than other indicators, remains statistically significant. This aligns with the understanding that energy infrastructure often catalyzes parallel investments in transportation, communication, and education—collectively enhancing the local enabling environment (Farahti et al., 2024; Xu et al., 2024). Moreover, improvements in energy affordability and accessibility create positive feedback loops that further stimulate local economies, particularly when integrated with smart energy systems and community-based initiatives (Liu et al., 2018; Zhang et al., 2020).

On the social front, the results affirm the crucial role renewable energy can play in strengthening community well-being. The highest-rated social indicator, "increase in environmental awareness and education among residents" (mean = 4.18), demonstrates that renewable projects are not merely technological interventions but also socio-cultural ones. These projects often introduce environmental literacy programs, local engagement processes, and sustainability campaigns, which contribute to long-term shifts in attitudes and behaviors (Raeisi & Ahmadvand, 2018; Rezaei et al., 2022). Public acceptance and engagement, as noted in the literature, are pivotal to the success of renewable energy transitions (Rezvani & Abedi, 2020; Sovacool et al., 2021).

The indicators "enhancement of social participation" (mean = 4.01) and "increase in sense of belonging and cohesion" (mean = 3.94) point to the capacity of clean energy projects to act as community-building tools. These findings resonate with international and local studies that document how participatory renewable energy governance can empower marginalized groups, strengthen democratic engagement, and foster trust in public institutions (Opoku et al., 2024; Rezaei et al., 2022; Simas & Pacca, 2020). Particularly in Iran, where rural communities often face underrepresentation in national policymaking, such inclusive mechanisms can promote greater social justice and equity (Rostami et al., 2024).

The indicator "reduction in migration" (mean = 3.85), although positive and significant, ranked the lowest among social impacts. This suggests that while renewable energy development contributes to local stabilization, it may not be sufficient on its own to deter migration without complementary policies in housing, education, and employment. This insight mirrors findings from both Iranian and global contexts, where energy interventions must be embedded in broader rural development strategies to yield sustainable demographic outcomes (Jouali, 2024; Nasiri, 2021).

The multiple regression analysis further validates the dual contribution of economic and social impacts to overall community satisfaction. The model yielded a coefficient of determination (R^2) of 0.507, indicating that over 50% of the variance in local satisfaction can be attributed to the combined influence of the two variables. Notably, the economic dimension ($\beta = 0.531$) had a slightly stronger effect than the social dimension ($\beta = 0.358$), although both were statistically significant. These results are consistent with earlier research suggesting that material improvements in employment and income often serve as the initial drivers of public support, while social outcomes consolidate long-term acceptance and engagement (Xie & Lin, 2025; Zgurskyy, 2024).

These findings also echo the broader global discourse on the co-benefits of renewable energy transitions. According to the International Energy Agency, countries that successfully scale renewable energy do so not only by leveraging technological innovation and financial tools but also by ensuring the inclusion of communities in planning and benefit-sharing frameworks (IEA, 2022). Iran's strategic potential in this regard is notable, particularly given its vast untapped solar and wind resources, growing number of SMEs in the green sector, and rising public interest in sustainable development (Ramezani Khouzestani & Reza Nazabadi, 2018; Zhang et al., 2024).

The study also reinforces the significance of adaptive and future-oriented business models in the renewable energy sector. As emphasized by (Deilami Azodi et al., 2020) and (Khalili et al., 2025), flexibility and innovation in energy systems—such as Power-to-X integration and financial leasing options—enhance the resilience of renewable enterprises and increase their ability to respond to external shocks. Moreover, business ecosystems that embrace circular economy principles can create synergies between economic and environmental objectives, fostering long-term competitiveness and sustainability (Pieroni et al., 2019).

This study, while comprehensive in its scope and methodology, is not without limitations. First, the sample size, although adequate for statistical analysis, was restricted to specific regions in Iran and may not fully represent the diversity of socio-economic contexts across the country. Second, the reliance on self-reported perceptions through questionnaires introduces the possibility of response bias, particularly in the case of socially desirable answers. Third, the study focused primarily on solar and wind energy, and did not account for emerging technologies such as bioenergy or geothermal, which may have distinct socio-economic implications. Lastly, the cross-sectional nature of the study precludes causal inferences about the long-term impacts of renewable energy development.

Future studies should consider longitudinal designs to evaluate the sustained effects of renewable energy projects over time. Additionally, incorporating qualitative methods such as in-depth interviews and focus groups could enrich the understanding of community experiences and perceptions. Expanding the geographic scope to include underrepresented or marginalized regions in Iran would also enhance the generalizability of the findings. Furthermore, comparative analyses between different types of renewable technologies could yield insights into their relative effectiveness in generating socio-economic benefits. Researchers are also encouraged to investigate the gendered dimensions of renewable energy adoption, especially in rural settings where energy access can transform household dynamics.

Policymakers should integrate renewable energy strategies into broader regional development plans to maximize socio-economic returns. Local governments must be empowered to lead participatory planning processes that ensure the inclusion of diverse community voices. Investments should be accompanied by capacity-building programs that support entrepreneurship, especially among youth and women. Financial instruments such as green bonds and microcredit should be leveraged to reduce entry barriers for SMEs. Finally, monitoring and evaluation systems should be institutionalized to track the social and economic outcomes of renewable projects, enabling evidence-based decision-making and adaptive policy design.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

Acknowledgments

We would like to express our gratitude to all individuals helped us to do the project.

Declaration of Interest

The authors report no conflict of interest.

Funding

According to the authors, this article has no financial support.

Ethics Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were considered.

References

Deilami Azodi, A., Khodadad Hosseini, S. H., Kordnaeij, A., & Meshbaki Esfahani, A. (2020). Conceptualization and explanation of the adaptation model of the business model in the information and communication technology industry. *Business Strategies*, *33*(17), 77-106. https://cs.shahed.ac.ir/article_2451.html?lang=en

Farahti, M., Salimi, L., & Gholizadeh Arat Bani, M. (2024). Financing Renewable Energy Projects: A Case Study of Selected Developing Countries. *Iranian Journal of Energy Economics*. https://doi.org/10.22054/jiee.2024.76012.2042

Hassan, Q., Viktor, P., Al-Musawi, T. J., Ali, B. M., Algburi, S., Alzoubi, H. M., Khudhair Al-Jiboory, A., Zuhair Sameen, A., Salman, H. M., & Jaszczur, M. (2024). The renewable energy role in the global energy transformations. *Renewable Energy Focus*, *48*, 100545. https://doi.org/10.1016/j.ref.2024.100545

IEA. (2022). *Renewables 2022: Analysis and forecast to 2027*. International Energy Agency. https://link.springer.com/article/10.3103/S0003701X23600704

Ji, C. Y., Tan, Z. K., Chen, B. J., Zhou, D. C., & Qian, W. Y. (2024). The impact of environmental policies on renewable energy investment decisions in the power supply chain. *Energy Policy*, *186*, 113987. https://doi.org/10.1016/j.enpol.2024.113987

Jouali, Y. (2024). The Consumption of Renewable Energy as a Clean and Sustainable Alternative and Its Impact on Economic Growth in the MENA Region. *Journal of Infrastructure Policy and Development*, *8*(8), 6247. https://doi.org/10.24294/jipd.v8i8.6247

Khalili, S., Lopez, G., & Breyer, C. (2025). Role and trends of flexibility options in 100% renewable energy system analyses towards the Power-to-X Economy. *Renewable and Sustainable Energy Reviews*, *212*, 115383.

Liu, Y., Yao, S., Xiao, S., & Gu, X. (2018). Review of status developments of high-efficiency crystalline silicon solar cells. *J. Phys. D: Appl. Phys*, *51*(12). https://doi.org/10.1088/1361-6463/aaac6d

Mobini Dehkordi, A., & Torkaman, J. (2020). Analytical comparison of business networks and business ecosystems. *Strategic Studies in the Oil and Energy Industry (Human Resource Management in the Oil Industry)*, *11*(44), 3-32. https://iieshrm.ir/article-1-896-fa.html

Nasiri, F. (2021). Analysis of the economic effects of wind energy on local businesses in Khorasan Razavi province. *Journal of economics and regional development*, *11*(2), 55-70. https://ue.ui.ac.ir/article_29269.html

Opoku, E. E. O., Acheampong, A. O., Dogah, K. E., & Koomson, I. (2024). Energy innovation investment and renewable energy in OECD countries. *Energy Strategy Reviews*, *54*, 101462. https://doi.org/10.1016/j.esr.2024.101462

Pieroni, M., McAloone, T., & Pigosso, D. (2019). Business model innovation for circular economy and sustainability: A review of approaches. *Journal of Cleaner Production*, 198-216. https://doi.org/10.1016/j.jclepro.2019.01.036

Raeisi, A., & Ahmadvand, A. M. (2018). Dynamic analysis of the development of solar energy use in Iran. 1st National Conference of the Iranian System Dynamics Association, Tehran.

Ramezani Khouzestani, M., & Reza Nazabadi, M. (2018). Explaining the necessity of developing renewable energies in Iran with emphasis on solar energy. 6th Iranian Conference on Renewable Energies and Distributed Generation, Tabriz.

Rezaei, M., Taheri Azadeh, D., & Davoudi, H. (2022). Examining the social effects of the development of solar power plants on rural communities in Kerman province. *Environmental Sciences Journal*, *24*(3), 87-103. https://iranthinktanks.com

Rezvani, M., & Abedi, S. (2020). The role of new energies in empowering local communities: A case study of Tabas city. *Quarterly Journal of Planning and Spatial Armature*, *25*(1), 119-135. https://ensani.ir/fa/article

Rostami, S., Anousheh, M., Darvishi Satlani, F., Keshavarz Turk, A., & Mohammadi Hosseini, B. (2024). Identifying drivers of entrepreneurship development in renewable energy: Providing a structural interpretive model with a foresight approach. *Environmental Education and Sustainable Development Journal*, *13*(1), 119-134.

Simas, M., & Pacca, S. (2020). Socio-economic benefits of wind power in Brazil: Local community perspectives. *Energy Policy*, *146*. https://doi.org/10.1016/j.enpol.2020.111749

Sovacool, B. K., Sivarajah, U., Irani, Z., Gupta, S., & Mahroof, K. (2021). The socio-economic impacts of renewable energy: A review of the literature Role of big data and social media analytics for business to business sustainability: A participatory web context. *Renewable and Sustainable Energy Reviews*, *141*, 163-179. https://doi.org/10.1016/j.rser.2021.110791 10.1016/j.indmarman.2019.04.005

Statista. (2024). *Share in the total final energy consumption of renewable energy in Iran from 2014 to 2029*. https://www.statista.com/forecasts/1151277/renewable-energy-share-forecast-in-iran

Wanniarachchi, T., Dissanayake, K., & Downs, C. (2020). Improving sustainability and encouraging innovation in traditional craft sectors: the case of the Sri Lankan handloom industry. *Research Journal of Textile and Apparel*, *24*(2), 111-

130DO - 110.1108/RJTA-1109-2019-0041. https://www.emerald.com/insight/content/doi/10.1108/RJTA-09-2019-0041/full/html

Xie, Y., & Lin, B. (2025). Financial leasing and China's renewable energy firms' investment behavior: In the context of government subsidy reduction. *Renewable and Sustainable Energy Reviews*, *214*, 115547.

Xu, G., Yang, M., Li, S., Jiang, M., & Rehman, H. (2024). Evaluating the effect of renewable energy investment on renewable energy development in China with panel threshold model. *Energy Policy*, *187*, 114029. https://doi.org/10.1016/j.enpol.2024.114029

Zanganeh, M., Aghajeri, E., & Forozanfar, M. (2021). Implementation of a smart algorithm based on fuzzy logic for energy resource management of a power generation system including solar energy and a storage source using Arduino boards. *Quarterly Journal of Intelligent Methods in the Electricity Industry*, *13*(49). https://www.sid.ir/paper/1034561/en

Zgurskyy, M. (2024, 2024). *Renewable Energy Technologies: Progress and Future Directions*. https://answerthis.io/blog/renewable-energy-technologies-progress-and-future-directions

Zhang, Y., Ren, J., Pu, Y., & Wang, P. (2020). Solar energy potential assessment: A framework to integrate geographic, technological, and economic indices for a potential analysis. *Renewable Energy*, *149*, 577-586. https://doi.org/10.1016/j.renene.2019.12.071

Zhang, Y., Zheng, K., Xia, F., & Cheng, Z. (2024). Fintech, natural resource rents, renewable energy consumption and environmental quality: A perspective of green economic recovery from BRICS economies. *Resources Policy*, *89*, 104604. https://doi.org/10.1016/j.resourpol.2023.104604

Zhaoa, F., Chena, X., Yia, Z., Qina, F., Tanga, Y., Yaoa, W., Zhoua, Z., & Yougen. (2020). Study on the solar energy absorption of hybrid solar cells with trapezoidpyramidal structure based PEDOT: PSS/c-Ge. *359*, 277-386. https://www.sciencedirect.com/science/article/pii/S0038092X20305211