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Providing a growth model based on clean energy with an emphasis on the government's general policy with a qualitative approach

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Abstract

This research is descriptive-analytical in terms of data collection and also inductive-deductive in terms of research approach. The participants in the qualitative section, including all experts and experts with educational, research (university) records, and executive experts (managers and experts of the Ministry of Energy), were selected in a targeted manner, ensuring a comprehensive and diverse range of perspectives. By using a document study, the initial interview questions were formed. After providing the written text of the participants' answers, the process of examining the overt and hidden content of the information gathered from the statements and writings began, ensuring a deep understanding of the data. From the 213 extracted primary codes, 67 basic themes were extracted, and after categorization, 10 organizing themes were extracted, and in the final stage, 4 overarching themes were extracted by examining the organizing themes. These topics include clean energy use policies , Cultivation in society for the use of clean energy (socializing the use of clean energy and strengthening the values and culture of using clean energy by institutions), Strategies for the use of clean energy (strategies for enabling clean energy and strategies for the optimal use of clean energy resources) and the consequences of the development of clean energy (environmental requirements, energy optimization, economic growth).

Keywords: clean energy, general policy of the government, development consequences, exploitation strategies, culture building

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1- Introduction

Nowadays, providing clean energy as one of the required inputs of economic activities in helping sustainable development is an inevitable necessity. The limited fossil energy resources in the world, the absorption and purification of pollutants caused by the consumption and combustion of fossil fuels, the continuous changes in production technologies, and the existence of national and international requirements related to the consumption of these resources make the world community to seek the expansion of renewable and sustainable energies to meet their needs. The expansion of clean energy in production sectors and increasing the efficiency of appropriate energy supply sources play a significant role in the continuation of the development process of economic activities. Clean energy is a type of renewable energy that is obtained from natural sources. A renewable energy source is obtained through a natural source or processes that are being renewed and produced again (Lotfi et al., 2016).

Renewable energies are based on new technologies that have significantly contributed to energy supply in industries and organizations in the last few years. Transportation systems, air conditioning, and lighting systems are examples of these applications. Using clean energy causes less damage to environmental factors, including weather. With the development of clean energy and investment in this sector, we will be able to benefit from a healthier environment by reducing environmental pollution, and also by creating industries and factories related to this energy, we will have a safer, cleaner future. Let's create a more sustainable energy for our beloved Iran. Many countries, especially developed countries, have tried to make a necessary platform for developing this type of energy by implementing various policies in this field, such as guaranteed purchase policies, the standard portfolio of renewable energies, and the quota policy. It is worth mentioning that despite the high initial costs of the production of renewable energy, the jump in the GDP due to the use of this energy can compensate for the initial costs and ensure more stable and reliable economic growth (Nozari et al., 2022).

The efforts of countries to achieve continuous and stable economic growth and development cause the increasing use of natural resources and create environmental problems. Therefore, many countries consider the use of renewable energies necessary to achieve the goals of sustainable development. The importance of clean energy in sustainable development, reducing greenhouse gases and increasing energy security, the need for financial resources and large investments for clean energy projects, and the role and importance of domestic and foreign capital development in energy development. The high gas and electricity consumption has faced many problems in the countries' industries (Najafi et al., 2022).

Therefore, considering the importance of clean energy development and the necessity of studies in the field of clean energy development by examining the public policies of the government in countries, in this research, an attempt is made to comprehensively explore the background of research and researchers who are in the field of clean energy development. have been active, a model in the field of clean energy development should be presented considering the importance of

research in the field of clean energy development. Also, it should be designed, explained, and tested by examining the general policies of the government. It should be determined how the presentation of the growth model based on clean energy is with emphasis on the general policy of the government.

2- Literature review

Energy supply and exploitation is an important and complex issue, so no energy or technology can meet the energy needs of the entire society. Different regions and countries have different energy sources, economic and technical development levels, and lifestyles. Therefore, they have different energy needs and there is no single solution. In its various forms, clean energy development is a common international goal (Mundaka et al., 2019). Policymaking is how governments translate their political vision into plans and actions to bring about the changes they want. According to principle 13 of the general policies of the system, which is to increase the share of renewable energies in the direction of public interests and in the service of public security, accelerating the expansion of renewable energies should be prioritized in government decisions (Monavaryan et al, 2020; Rahmaty & Nozari, 2023).

The development and expansion of renewable energy helps to achieve the goals of growth and development, especially economic and environmental development in a country and achieve sustainable development. The use of renewable energy can reduce dependence on fossil resources, reduce the emission of polluting gases from the production and consumption sectors of energy resources, and also reduce the emission of greenhouse gases that have a significant impact on global warming, and consequently, maintain safety and health. The use of renewable energy brings significant short, medium and long-term benefits such as energy supply security, sustainable development of local industries, job creation and environmental sustainability. Meanwhile, fossil energy sources, in addition to being non-renewable, have many negative effects on health and the environment due to the emission of greenhouse gases such as carbon dioxide. Renewable energies, with the ability to create job opportunities and generate income, empower and strengthen the self-reliance of local communities and help to achieve the goals of poverty alleviation. Electricity production from renewable sources, including small hydropower generators and non-electrical energy consumption such as solar heaters and dryers, wind pumps, and solar purifiers, play a positive role in the sustainable development of cities and villages (Ghadri et al., 2020; Nozari , 2024).

The shift towards sustainable energy systems remains an important international policy issue (Camacho Ballesta et al., 2022). For several decades, evidence from various studies has increasingly emphasized the fact that continued reliance on fossil fuels not only poses a major challenge to environmental sustainability, but also negatively affects the quality of life and human well-being (Burke and Stephens, 2018). With the energy sector alone accounting for more than two-thirds of total global greenhouse gas emissions, there are calls for governments, development

partners and local stakeholders to initiate urgent transformative efforts aimed at transitioning to clean and sustainable energy options (Malerba, 2022; Arendt et al., 2017).

Renewable energy sources have a much less destructive impact on the environment than conventional energy production methods because they are clean energy sources with almost no carbon emissions. Therefore, considering the environmental effects, renewable methods can be preferred over other methods (Tarhan and Cil, 2021). Burning fossil fuels in the presence of oxygen is an important factor in the discharge of greenhouse gases, which in turn leads to pollution, global climate change, and environmental damage (Maka and Mahmood, 2024).

3- Methodology

This research is descriptive-analytical in terms of data collection and also inductive-deductive in terms of research approach. In the qualitative part, through interviews with 15 experts and experts with educational, research (university) records, and executive experts (managers and experts of the Ministry of Energy) in a targeted manner, it continued until 12 people were theoretically saturated. By using document study (reading books, articles, and related research), the initial interview questions were formed. After providing the written text of the participants' answers, the process of examining the overt and hidden content of the information gathered from the statements and writings began. The purpose of this process was to extract the components of the presentation of a growth model based on clean energy with an emphasis on the government's general policy with a qualitative approach. To analyze the text of the interviews, the thematic analysis method of Brown and Clark (2006) was used with the help of MAXQDA software.

4- Research findings

In this research, 15 people were interviewed. Out of 15 people, 7% (1 person) were women and 93% (14 people) were men. 53% (8) had a doctorate degree and 47% (7) had a master's degree. 213 primary codes were extracted from all the interviews. Most codes were extracted from interviews with numbers 2, 1, 3, 5, 7, 4, and 15, and the least codes were from interviews with numbers 13 and 8. In the following, these basic themes were classified and organized, and comprehensive codes were extracted. In the following, 67 basic themes were extracted from the 213 primary codes, and after categorization, 10 organizing themes and in the final stage, by examining the organizing themes, 4 comprehensive themes were identified under the title of clean energy use policies, building a culture in the society to use energy. Clean energy, clean energy use strategies, and the consequences of clean energy development were obtained.

Table 1: Basic, organizing, and overarching themes extracted from the interviews

Overarching theme	Sub-themes	Basic theme
Clean energy use policies	Targeting for the development of clean energy	planning
		Roadmap design
		Scientific and systematic decision making process
		Laws and legal issues
		Coordination of government institutions
		Public and private sector participation
		Financial and support policies
		Clarity and stability of the program
		Regulations
		Institutional arrangement
		Institutional stability
	Developing the use of clean energy	Thermal energy development
		Development of biomass energy
		Development of hydropower
		Development of wind energy
		Development of solar energy
		Development of nuclear fuel cycle
		Use of biomass energy
		Use of wave energy
	Development of clean energy technologies	Creation of knowledge-based companies and research centers
		Knowledge management
		Technology transfer
		International technological cooperation
		Achieving the latest technology in the world
		Get ideas from stakeholders
		Creation of mission-oriented innovation centers

		Reducing the price of clean energy technologies
Cultivation in society to use clean energy	Socialization of the use of clean energy	Institutionalizing and complying and encouraging businesses towards clean energy
		Institutionalizing the culture of using clean energy
		Making educational and advertising films in line with the use of clean energy
		Informing the community about doing environmental tasks
		National media awareness
	Strengthening the values and culture of using clean energy by institutions	The effect of popular institutions in encouraging people to use clean energy
		Activities of political and active groups in the field of clean energy
		Holding festivals to promote the use of clean energy
		Holding national days and occasions to obtain support for the use of clean energy
Strategies for using clean energy	Strategies for enabling clean energy	Designing a suitable system to obtain clean energy sources
		Taking measures in locating, planning and designing clean energy facilities
		Designing a system for environmental purposes in locating energy facilities
		Creating a suitable environment to support the supply of foreign currency and Rial resources in the field of clean energy
		Taking measures to reduce obstacles in clean energy cycle management
	Strategies for optimal use of clean energy sources	Increase in the guaranteed purchase price of clean energy such as renewable electricity
		Guaranteed energy purchase agreement
		Allocation of financial resources of the National Development Fund to this industry
		Supporting clean energy producers
		Development of necessary infrastructure for transmission and distribution of clean energy

		Providing tax exemptions to clean energy users
Consequences of clean energy development	Environmental requirements	Reduce global warming
		Increasing social justice and environmental protection
		Reducing acid rain
		Reducing greenhouse gas emissions
		Reducing waste from energy production
		Reducing climate change
	Energy optimization	Energy supply and demand security
		Use of energy at a fixed price
		Diversification of the energy portfolio
		Maintain network security
		Sustainable sources for guaranteed purchases
		Network stability
		Power grid peak
	Economic development	Stimulating economic growth
		Creating employment
		Increase in per capita income
		Improving the business environment
		Market regulation
		Export of fossil resources
		Sustainable development of less developed areas

5- Discussion and conclusion

In general, this research aims to present a growth model based on clean energy, emphasizing the government's general policy with a qualitative approach. Therefore, the general framework of this research has been to explain this issue in a conscientious and systematic way. Targeting for developing clean energy policies in the Ministry of Energy includes various steps and details. Planning as the first step includes determining short-term, medium-term and long-term goals. These goals must be precise and measurable. Planning should be based on analyzing the current situation, identification of capacities and future needs. We can mention energy consumption

prediction models and SWOT analysis among the planning tools. Designing a road map includes identifying development paths and determining the steps to be taken. The development of clean energy policies in the Ministry of Energy can include different types of renewable energy, each of which uses various sources such as the sun, wind, water, biomass, and sea waves. These policies can help improve energy performance and reduce dependence on unsustainable energy sources. Geothermal energy is one of the renewable energy sources collected through the exploitation of the earth's heat. This energy source is used for residential heating systems, organizations, commercial buildings, and other heating uses. Water energy includes exploiting the power of water flows such as dams, water turbines, wave energy, and fluid flow. Establishing and strengthening institutions related to clean energy, including supervisory, executive, and research organizations, is one of the requirements of this department. The duties and responsibilities of each institution should be clearly defined and the coordination between them should be improved. Institutional stability means creating stable and resistant institutions against political and economic changes. These institutions must have strong structures, sufficient financial resources, and expert human resources. To develop clean energy policies in the Ministry of Energy, a comprehensive and multi-dimensional approach is needed that includes all planning, legal, executive and financial aspects. This approach should be formulated and implemented by taking advantage of international experiences and localizing them to the country's specific conditions.

The development of technology in the policies of using clean energy in the Ministry of Energy can be done in different ways, the purpose of which is to improve performance and transfer new technologies to clean energy. Therefore, the establishment of knowledge-based companies and research centers is useful for developing new and innovative technologies in the field of clean energy. These companies and research centers are taking steps towards research, development of sustainable energy projects and evaluation of new technologies. Knowledge management includes collecting, storing, transferring and benefiting from knowledge related to clean energy. This activity facilitates the improvement of organizational performance by sharing knowledge and experiences in clean energy production and consumption. Technology transfer includes transferring knowledge and research technologies from research centers to industry and market. Creating legal, financial, and technical platforms and conditions is necessary to encourage and support businesses that produce, develop, and use clean energy. These platforms include financial facilities, land allocation, and tax concessions. Institutionalizing the culture of using clean energy means creating a culture that encourages society to use clean energy responsibly and sustainably. Creating this culture means educating and informing people about the benefits of using clean energy for the environment and economy, promoting sustainable values , and reducing inappropriate energy consumption. Another step is to produce promotional and educational content to be presented to society to increase public awareness about clean energy. This process includes the making of documentary films, television and radio advertisements, and awareness campaigns in social media and the press. Making society aware of doing environmental tasks means educating and informing society about the importance of protecting the environment and reducing the negative effects of using fossil energies. This process includes promoting concepts such as

reducing energy consumption, separating and properly disposing of waste, and using renewable resources. Increasing the role and importance of public institutions, including environmental associations, non-governmental organizations, and civil groups, in promoting the use of clean energy. These institutions can encourage people to use clean technologies by conducting educational programs, research, and awareness activities. Also, supporting political groups and movements that promote and support the use of clean energy can be effective. These supports include existing laws and regulations and encouraging the development of national and regional policies for the development of clean energy. In addition, it is essential to hold festival events to educate and inform society about the benefits of using clean energy. These festivals can include exhibitions, film screenings, lectures, and workshops on clean energy. Another step is to create national occasions and special days to attract public attention and support using clean energy. These occasions can be helpful as an opportunity to promote the concepts of sustainability and the use of clean technologies. These combined methods can lead to creating a sustainable culture and environmental values in the society that encourage and facilitate the use of clean energy in the Ministry of Energy. These measures not only help to improve the environment but also contribute to sustainable economic and social development.

Clean energies such as wind, solar, and hydroelectric energy produce the most minor greenhouse gases instead of fossil fuels such as oil and coal. Clean energy can help reduce the emission of CO2 and other greenhouse gases and thus reduce global warming. Clean energy development can help create local job opportunities and improve economic conditions in deprived areas. Environmental protection and preservation of natural resources are other benefits of this development that support social justice. Reducing acid rain caused by sulfur and nitrogen oxides released into the atmosphere from fossil fuels such as oil and coal is one of the other benefits of using clean renewable energy. By using clean energies that do not produce these oxides, acid rain can be reduced, and air quality can be improved. Energy optimization, including careful management of supply and demand for clean energy, can strengthen the security of energy supply and demand. By determining the appropriate strategies for producing, transmitting, storing, and consuming clean energy, it is possible to avoid unpredictable fluctuations in the energy supply and prevent imbalances in the energy markets. Determining a fixed price for clean energy can help predict the costs related to energy supply more accurately and prevent sudden price increases. This assures generating and consuming companies that energy-related costs are predictable and manageable. Energy optimization allows the Ministry of Energy to diversify the energy portfolio, introducing different types of clean energy, such as wind, solar, hydroelectric, biomass, etc., in the national energy system. The development of clean energy can strengthen competitiveness and the business environment. By allocating resources to research and development, innovation in clean and cheap technologies, and supporting knowledge-based companies and related startups, these sectors will be able to compete with other sectors of the economy. Clean energy development can also lead to regular improvements in the energy market. This includes regulations and rules to promote oversight, regulate prices, facilitate competition, and ensure network security. With the expansion of the use of clean energy, the reduction of dependence on fossil resources increases.

This development can directly impact the growth of the export of fossil resources and the country's international trade. The development of clean energy can contribute to the sustainable development of less-developed regions, as these regions usually have less access to energy resources. Creating the necessary infrastructure for clean energy production, such as solar, wind, and hydroelectric power plants, can put these areas on the path of sustainable development. Clean energy development in the Ministry of Energy can bring positive and extensive economic consequences. Implementing these strategies requires comprehensive planning and appropriate support from the government and related institutions to optimize clean energy resources and realize sustainable economic development goals.

It is suggested that the model presented in this research be tested in other organizations in order to develop and generalize it. Future researchers should examine the financial infrastructure and core competencies in providing a growth model based on innovation in clean energy industries, with an emphasis on policymaking and the general policy of the government and other organizations.

References

Burke, M. J. & Stephens, J. C. (2018). Political Power and Renewable Energy Futures: A Critical Review. Energy Research and Social Science, 35, 78-93.

Camacho Ballesta, J. A., da Silva Almeida, L. & Rodríguez, M. (2022). An analysis of the main driving factors of renewable energy consumption in the European Union. Environ Sci Pollut Res, 29, 35110-35123.

Ghaderi, S., Khanzadi, A., & Karimi, M. S. (2021). Evaluating and analyzing the effects of green tax policy enforcement on renewable energies development in Iran. Journal of Development and Capital, 5(2), 105-121.

Lotfi, F. H. Z., Najafi, S. E., & Nozari, H. (Eds.). (2016). Data envelopment analysis and effective performance assessment. IGI Global.

Maka, A. O. M. & Mehmood, M. (2024). Green hydrogen energy production: current status and potential. Clean Energy, 8(2), 1-7.

Malerba, D. (2022). Just transitions: a review of how to decarbonize energy systems while addressing poverty and inequality reduction. Discussion Paper 6/2022. German Development Institute, Bonn.

Monavariyan, A., Vatankhah Moghaddam, S., Shah Hoseini,, M. A., Vaezi, S. K., & Noorollahi, Y. (2020). Designing of Policy Making Model of Renewable Energy Development in Iran. *Iranian Journal of Public Policy, 6*(2), 115-134. doi: 10.22059/jppolicy.2020.77616

Mundaca, L., Ürge-Vorsatz, D. & Wilson, C. (2019). Demand-side approaches for limiting global warming to 1.5 °C. Energy Efficiency, 12, 343-362.

Najafi, S. E., Nozari, H., & Edalatpanah, S. A. (2022). Artificial Intelligence of Things (AIoT) and Industry 4.0–Based Supply Chain (FMCG Industry). A Roadmap for Enabling Industry 4.0 by Artificial Intelligence, 31-41.

Nozari, H. (2024). Green Supply Chain Management based on Artificial Intelligence of Everything. Journal of Economics and Management, 46, 171-188.

Nozari, H., Ghahremani-Nahr, J., Fallah, M., & Szmelter-Jarosz, A. (2022). Assessment of cyber risks in an IoT-based supply chain using a fuzzy decision-making method. International Journal of Innovation in Management, Economics and Social Sciences, 2(1).

Rahmaty, M., & Nozari, H. (2023). Optimization of the hierarchical supply chain in the pharmaceutical industry. Edelweiss Applied Science and Technology, 7(2), 104-123.

Tarhan, C. & Çil, M. A. (2021). A study on hydrogen, the clean energy of the future: Hydrogen storage methods. Journal of Energy Storage, 40, 102676.