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Evaluations of Sustainable and Green Energy Policies

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Scientific committee members	Steven Salzberg, Anupama Kumar, Daniel Weselka, Albena Vutsova, Barbara Pauly
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Evaluations of Sustainable and Green Energy Policies

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Conclusions

1. The principal research and development project has been completed,
2. Evaluations of Sustainable and Green Energy Policies has been put forward, and continues to be developed,
3. The edited book titled as "Sustainable and Green Energy Policies" (ISBN: 979-8-89113-773-8; https://doi.org/10.52305/LBKY7233) which one of the project outputs have been published by Nova Science Publishers.
4. Two chief researchers and 45 scientific researchers participated and collaborated in this Project. The list of researchers is below:

Ahmet Alptekin Duru, Ahmet Bilal Sengul, Ahmet Tan, Aleaddin Yalcinkaya, Alp Yuce Kavas, Amin Ghannadi, Arzu Al, Ayse Ozcan Buckley, Baris Armutcu, Buket Teneke Oduncu, Cihat Kartal, Demet Ever, Dogan Nadi Leblebici, Elif Nursun Demircioglu, Elif Yilmaz, Emine Nihan Cici Karaboga, Engin Kilicatan, Eray Aktepe, Eser Gemici (Chief Researcher), Fatma Gecikli, Fatma Selen Madenoglu, Filiz Ekici, Gamze Sekeroglu, Hakan Aridemir, Ilyas Kays Imamoglu, Ipek Yalic, Kursad Emrah Yildirim (Chief Researcher), Mehmet Sadik Akyar, Meral Balci, Mert Demircioglu, Merve Gecikli, Meryem Nergis Atacay, Muzeyyen Ozhavzali, Nurgul Bekar, Nurten Derici Temel, Seda Cankaya Kurnaz, Sefa Emre Yilmazel, Sercan Yavan, Serhat Koca, Serkan Kunu, Sevgi Esiyok, Sumeyye Ozer, Tutku Tuncali Yaman, Umran Sengul, Vildan Bayram,Yusuf Esmer, Yusuf Girayalp Atan

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ENERGY POLICIES, POLITICS AND PRICES

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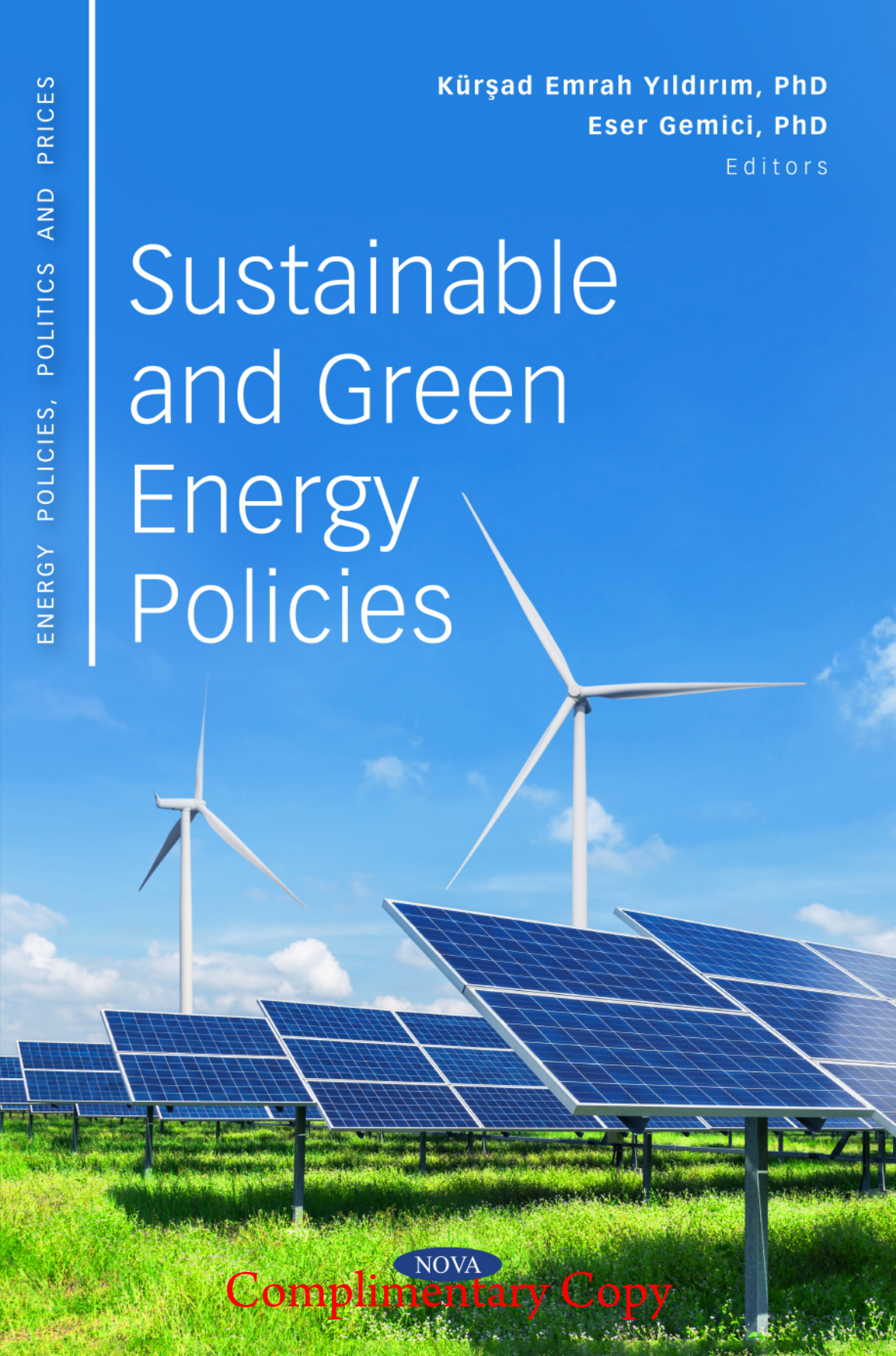
Eser Gemici, PhD
Editors

Sustainable and Green Energy Policies



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Sustainable and Green Energy Policies



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Chapter 13

The Role of Renewable Energy in Uzbekistan's Strategy to Become a Regional Power

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Abstract

Uzbekistan's role in the regional and global energy markets has increased within the framework of the policy of becoming a regional power. In this context, the Ministry of Energy of Uzbekistan aims to provide a quarter of all electricity from renewable energy sources for the period 2023-2030. Therefore, while developing large-scale projects with international partners to expand its renewable energy capacity, Uzbekistan is on its way to sustain its strategy of becoming a regional power by diversifying its energy supply. The main question of this study is to examine the role of renewable energy policies in the Uzbekistan strategy to become a regional power. The study aims to reveal the impact of renewable energy resources on Uzbekistan's strategy of becoming a regional power.

Keywords: renewable energy, Uzbekistan, strategy, regional power.

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Introduction

Since the beginning of international relations, the concept of power has been the most fundamental determinant. The power of a state shapes its foreign policy and its relations with international actors. In the twenty-first-century structure of international politics, one of the most fundamental points of power and conflict among states is the energy issue. Features such as having energy, exporting energy, and being on the energy transfer line increase the geopolitical value of countries. In this context, diversification of energy supply and the use of renewable energy resources instead of depleting energy are of vital importance, especially for countries with increasing energy needs. Uzbekistan has the qualities of being a regional power with its geopolitical position, developing economy, population structure, and energy resources.

Central Asia has been a focal point of geopolitical interest for centuries. The description of this region has changed since a borderless network has been experienced around the region. This network extends to the South Caucasus, Afghanistan, Pakistan, Iran, and even Turkiye (Behbahani, 2020). Therefore, Central Asia has witnessed the presence and serious attachments of some powers in the region. In this intricate landscape, Uzbekistan stands as a significant player, both in terms of its historical influence and contemporary strategies to assert regional power. The ancient Silk Road traversed its territories, connecting civilizations and facilitating the exchange of goods and ideas (Baisalov, 2018). For this reason, Uzbekistan wants to be a main player in this game and wants to prove its presence as a regional power in its region (Faramani & Moradi, 2014). As a primary regional power, Uzbekistan aims to have an important role in international affairs outside of its region (Baisalov, 2018).

With the end of the Cold War, the republics of Central Asia have taken their place as independent states in international politics. Uzbekistan is predominantly geostrategically important due to its central location in Central Asia. On the other hand, Uzbekistan, which has the largest and youngest of the 35 million population (Worldometer, n.d.) in the region, is a regional power in Central Asia (Faramani & Moradi, 2014), especially with its developed foreign affairs since 2017.

Shavkat Mirziyoyev started to pursue a new policy of opening to the outside world (Toktogulov, 2022). The steps taken in this period, called the "new Uzbekistan", have also increased the need for energy because of the new economic and other developments. In this context, the diversification of energy supply will also affect Uzbekistan's power in foreign policy, the

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economy, and trade. Positioned at the crossroads of Central Asia, Uzbekistan's ambitious goal of becoming a regional power is intrinsically linked to its ability to harness and leverage the potential of renewable energy sources.

With its developing industry, Uzbekistan has an urgent need to produce its own energy. Consuming the most electrical energy in Central Asia, Uzbekistan obtains more than 70% of its electrical energy from natural gas. Uzbekistan's fuel and energy resources are 97% oil and natural gas, 2.3% coal, and 0.7% hydroelectric power plants.

Uzbekistan is the first country in Central Asia to use solar energy, and a state company called *Uzbekenergo* is also operating in Uzbekistan to improve its work on energy. It is stated that the renewable energy potential of Uzbekistan, with 300 sunny days a year, is equivalent to 51 billion tonnes of oil. Thanks to solar energy, Uzbekistan can also have the potential to stand out as a (renewable) energy giant in the region. In the heart of Central Asia, Uzbekistan's commitment to harnessing renewable resources not only shapes its own energy landscape but also positions the nation as a significant actor in the region's power dynamics. As Uzbekistan takes bold steps towards becoming a regional power, the integration of renewable energy into its national strategy not only demonstrates its commitment to a greener future but also places the nation at the forefront of a changing global energy landscape.

The Dynamics of Regional Power in International Relations

In the complex landscape of international relations (IR), the concept of power is central to understanding how states and other actors interact and influence global dynamics. While traditional power structures have been largely dominated by major global powers, the role of regional powers has gained prominence in recent decades. Regional powers are states with significant influence within their respective geographical regions, often playing pivotal roles in shaping regional security, politics, and economics (Gaertner, 2008).

Regional powers derive their influence from a combination of geographical, economic, military, and diplomatic factors. Geographical proximity allows these states to establish intricate networks of alliances and trade relationships, positioning them as natural leaders within their regions. Economic strength also plays a crucial role. Military capabilities are another source of regional power, as a strong military presence can deter potential challengers and bolster a state's security posture. Diplomatically, regional

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powers often play mediating roles in conflicts, fostering stability, and projecting an image of leadership.

While regional powers wield considerable influence, they also face challenges that can limit their effectiveness (Nolte, 2010). Regional powers often find themselves caught between the interests of major global powers, leading to pressure to align with one another, potentially jeopardizing their autonomy. Political and social instability within a regional power can weaken its capacity to project influence and address regional challenges. As emerging economies grow in influence, they may challenge established regional powers, leading to power struggles and changes in regional dynamics. Regional powers must strike a balance between projecting strength and avoiding perceptions of aggression, as this could lead to counterbalancing by other regional actors (Destradi, 2010).

Energy has long been recognized as the cornerstone of modern civilization, which drives economies, industries, and societies forward. In an increasingly interconnected world, the relationship between energy and regional power has become a pivotal factor in shaping geopolitical dynamics. The ability of a nation to secure reliable and affordable energy sources is crucial to maintain economic stability and growth.

While being a regional power, another aspect is security. Energy security, the assurance of a stable energy supply, is a central concern for nations aspiring to regional power. The dependence on external energy sources can render countries vulnerable to supply disruptions and geopolitical manipulation. Therefore, energy security becomes a strategic imperative for regional power.

As the global energy landscape evolves with technological advancements and growing environmental concerns, the connection between energy and regional power will remain a focal point for policymakers and strategists alike. Recognizing the interplay between energy and regional power is essential for understanding the motivations and maneuvers of nations on the global stage.

Uzbekistan's Strategy to Become a Regional Power in Central Asia

The Uzbekistan strategy for regional power is underpinned by several key objectives. The most important of these elements is to ensure stability and security. Due to the geography of Uzbekistan, especially the fight against terrorism and radicalism, it is of great importance for both national and

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regional security. A state that contributes to ensuring security will gain the trust of its neighbors and the international community. Another key factor that will support Uzbekistan's claim of 'becoming a regional power' is its developing economy. Economic growth serves to strengthen Uzbekistan's influence. The country's vast energy resources, agricultural potential, and strategic geographical location enable it to play a pivotal role in regional economic integration (Figure 1).

In an increasingly interconnected world, connectivity has emerged as a fundamental element in shaping a nation's foreign policy. Uzbekistan, a pivotal player in Central Asia, has recognized the importance of connectivity in fostering economic growth, regional cooperation, and diplomatic relationships. Connectivity is at the heart of Uzbekistan's foreign policy agenda and supports the regional power policy of Uzbekistan.

Uzbekistan uses a multifaceted approach to secure its regional power. The bilateral partnerships increase the regional power of Uzbekistan. Establishing strong bilateral ties with neighboring countries, such as Kazakhstan, Tajikistan, Kyrgyzstan, and Turkmenistan, is a cornerstone of the Uzbekistan strategy (Toktogulov, 2022). Bilateral agreements encompass trade, security, infrastructure development, and cultural exchange.

By embracing connectivity, Uzbekistan not only accelerates economic growth and trade but also builds bridges of collaboration, fostering regional stability, and contributing to global progress. As the world becomes more interconnected, Uzbekistan's proactive approach to connectivity positions it as a vital player in the evolving dynamics of the 21st century. Uzbekistan's ambitious railway project through Afghanistan to Pakistan (Burna-Asefi, 2022) is a good example of its commitment to regional connectivity. This project aims to connect Uzbekistan with Afghanistan through a railway network, opening up trade routes and boosting economic ties. By fostering direct transportation links, Uzbekistan not only strengthens its trade relationships but also contributes to stability and development in its neighboring countries. By collaborating with its neighboring countries, Uzbekistan has established an energy corridor that not only diversifies its export options but also cements its role as a reliable regional partner. This initiative also strengthens diplomatic ties through shared energy interests.

Uzbekistan is developing its cooperation in the region with the agreements signed on energy. In this context, at the summit held in Ashgabat on 4 August 2023, it was confirmed by the heads of state that energy cooperation between Turkmenistan, Tajikistan, and Uzbekistan will increase (NCA, 2023).

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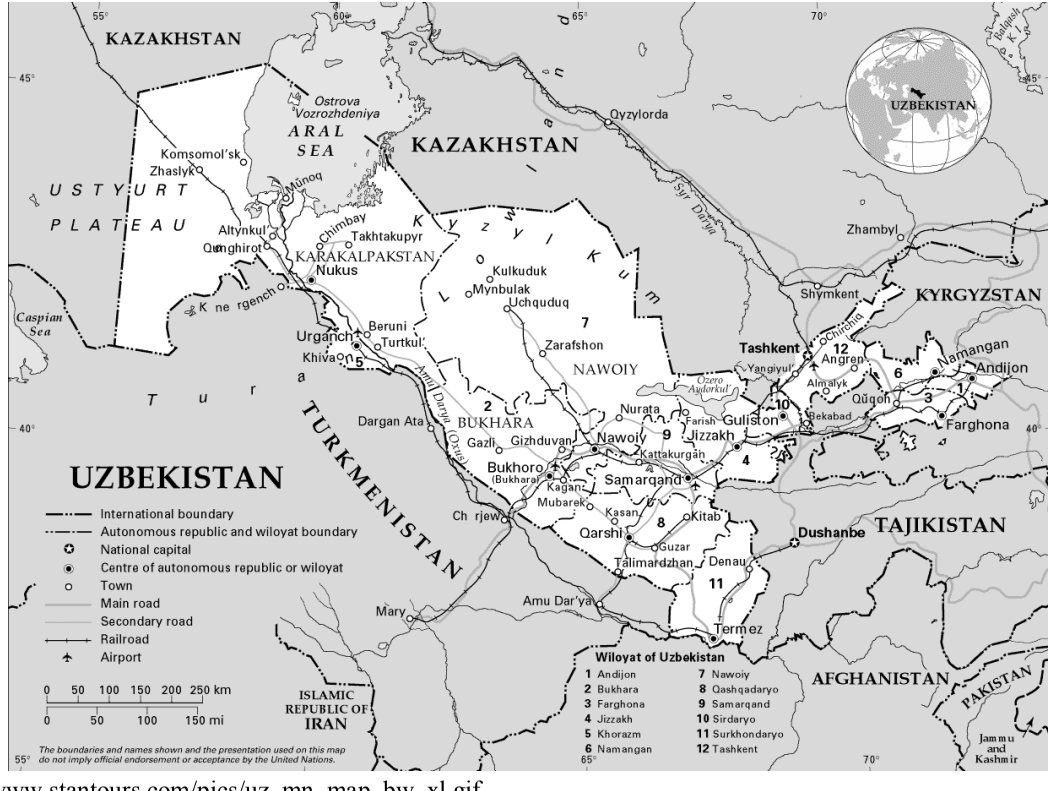

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Figure 1. The Map of Uzbekistan in Central Asia.

Uzbekistan's pursuit of regional power is not without challenges. Tensions over water resources, particularly regarding the shared Aral Sea basin, have strained relations with downstream neighbors. Balancing water needs with economic development presents a complex challenge. Border disputes and ethnic tensions with neighboring countries, especially Kyrgyzstan and Tajikistan, occasionally escalate, posing a threat to stability and cooperation. Uzbekistan must navigate the interests of major powers, including Russia, China, and the United States, which seek to assert their influence in Central Asia.

Uzbekistan's pursuit of regional power in Central Asia is a nuanced endeavor, rooted in a historical legacy, and driven by contemporary objectives. By prioritizing stability, economic development, diplomacy, and cultural engagement, the country seeks to shape the trajectory of the region while overcoming the challenges posed by resource disputes, ethnic tensions, and great power competition. As Uzbekistan continues to navigate this intricate landscape, its strategy of regional power remains a significant factor in shaping the future of Central Asia.

Renewable Energy of Uzbekistan

Uzbekistan's Changing Energy Policies Implemented in the Post-Soviet Period

Since renewable energy is vital for countries that consume more energy than they produce, Uzbekistan plans to improve its energy capacity by diversifying the product range. That's why plans for renewable energy sources have begun to play a major role in the energy supply of Uzbekistan. Uzbekistan's vast reserves of oil, natural gas, and minerals have provided it with significant leverage in international negotiations. The country's pursuit of energy diplomacy has enabled it to establish and strengthen ties with various countries and international organizations.

Energy is undeniably a driving force behind Uzbekistan's foreign policy decisions. The nation's vast energy resources provide a solid foundation for cultivating relationships, both regionally and globally, while its diplomatic efforts underscore the importance of sustainable energy management and collaboration. Uzbekistan's approach to energy diplomacy serves as a case study of how a nation can leverage its resources to promote regional stability, economic growth, and international engagement. As global energy dynamics

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continue to evolve, Uzbekistan's foreign policy will undoubtedly continue to adapt, making energy a key factor in its ongoing journey on the world stage.

Uzbekistan's foreign policy has been shaped by its pursuit of energy partnerships with its neighboring countries. As one of the world's largest natural gas producers, Uzbekistan's energy sector is currently undergoing a large-scale transition. Uzbekistan has made significant progress in the application of smart grid technologies in recent years to modernize its energy sector, increase the efficiency and reliability of its energy infrastructure, and reduce its dependence on fossil fuels (Balbaa & Abdurrashidova, 2023). An illustrative example is the Central Asia-South Asia (CASA-1000) project, which aims to create a regional electricity market by exporting surplus hydropower from Kyrgyzstan and Tajikistan to Afghanistan and Pakistan through Uzbekistan. Uzbekistan's involvement in this initiative not only fosters economic cooperation but also enhances its standing as a reliable regional partner.

Uzbekistan's energy diplomacy extends beyond economic and security considerations; it also serves as a means to project soft power and improve its international image. Uzbekistan's hosting of international energy forums and conferences, such as 'The Renewable Energy & Power Infrastructure Investors Conference in Tashkent, December 4, 2019' showcases; its willingness to engage with the global energy community.

It was only when Canada-based SkyPower Global invested in Uzbekistan's solar energy projects in 2018 did Uzbekistan have its first private plant (Central Asian Research Center, 2018). However, the first private attempt at renewable energy was unsuccessful.

An agreement was also signed between the Asian Development Bank and the United Arab Emirates firm MASDAR in the field of renewable energy in Uzbekistan. Under this agreement, solar panels will be installed in the Surkhandarya, Samarkand, and Jizzakh regions (ADB, 2023). Additionally, The World Bank is supporting in the amount of $ 12 million for the Scaling Solar 2 Project for Uzbekistan (The World Bank, 2023). In this context, the agreement signed by many Chinese companies for the production of electric vehicles in Uzbekistan should also be considered among the cooperations in renewable energy (Yahoo! Finance, 2023).

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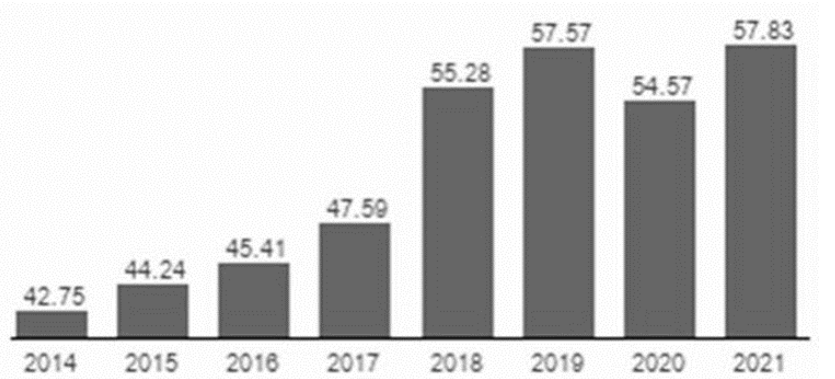
The Current State of Renewable Energy in Uzbekistan

The energy needs of Uzbekistan increase every year. Although the effect of the pandemic has stopped this increase, energy consumption has started to rise again in 2021, as seen in Figure 2.



Source: The Global Economy.

Figure 2. The Electricity Consumption of Uzbekistan in Billion Kilowatt Hours.

Table 1. ACWA Projects in Uzbekistan

Name of the Project	Location	Offtaker	Technology	ACWA Power Share	Offtake Contract
Karakalpakstan Wind IPP[1]	Karakalpakstan Region	JSC NEGU[2]	Onshore Wind + BESS[3]	100%	25 year
Dzhankeldy Wind IPP	Dzhankeldy, Bukhara Region	JSC NEGU	Onshore Wind	100%	25 year
Bash Wind IPP	Bash, Bukhara Region	JSC NEGU	Onshore Wind	100%	25 year
Karatau Wind IPP	Nukus, Karakalpakstan Region	JSC NEGU	Onshore Wind	100%	25 year
Sırdarya CCGT[4]	Shirin City, Sirderya Region	JSC NEGU	Gas-Turbine	51%	25 year

[1]IPP: Independent Power Project.
[2]NEGU: National Electric Grid of Uzbekistan.
[3]BESS: Battery Energy Storage System.
[4]CCGT: Combined Cycle Gas-Turbine.

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Uzbekistan became the first country from outside Africa to participate in the World Bank Group's (WBG) Scaling Solar Power Programme (The World Bank, 2023; Scaling Solar, 2021).[6] Following this participation, in May 2021, Uzbekistan announced public-private partnerships for two separate solar power plants in the Samarkand and Jizzakh regions. Masdar, a renewable energy company based in the United Arab Emirates, undertook this project. The World Bank has provided payment guarantees totaling up to $12 million under the WBG Scaling Solar Programme. The first power plant Navoi Scaling Solar 1 is the already operational first large-scale and privately developed and operated renewable energy facility in the country.

The new Solar 2 Project will be built on the success of the Navoi Scaling Solar 1 Project. The World Bank approved $15 million in financing support for the Scaling Solar Power 2 Project for Uzbekistan on March 15, 2023. It is envisaged that the project will help expand the country's capacity to generate clean and renewable energy. Furthermore, it is claimed that this project will promote the decarbonization of Uzbekistan's energy sector. Masdar will make an investment of $193 million in the Project Companies to realize these solar power plants. The $216 million debt financing package will be provided by the Asian Development Bank (ADB), the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), and the Asian Infrastructure Investment Bank (AIIB) (MASDAR, 2023).

Some multinational companies invested in renewable projects in Uzbekistan, such as Total Eren from France in the Samarkand region (Yuz. Uz., 2023), Cneec from China in the Jizzakh region (UZDAILY, 2023), and Cenergo in the Tashkent region (UZDAILY, 2021) from Turkiye. There are also other energy investments in Uzbekistan. Most of them are carried out by a Saudi Arabian company called ACWA. These investments are listed in Table 1.

Renewable Energy Potential as a Tool of Regional Power

In the heart of Central Asia, the Uzbekistan renewable energy policy is emerging as a strategic instrument of regional power, fostering cooperation, stability, and influence. The Uzbekistan renewable energy policy is not just an

[6] Scaling Solar: "one-stop shop" program implemented by the World Bank Group of forming feasible markets for solar power in different countries.

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environmental consideration; it is a strategic pillar that resonates with the country's ambition to wield regional influence.

The use of renewable energy sources in remote and inaccessible areas in mountains and semi-desert areas, as well as in remote pastures, is highly competitive with conventional energy sources (Bozorov et al. 2022). Several key aspects highlight the centrality of this policy. These are as follows:

1. Resources: Uzbekistan boasts abundant solar irradiance, wind potential, and hydropower capacity (Matchanov, 2019). Its vast deserts, highlands, and river systems provide fertile ground for various renewable energy technologies, creating a foundation for self-reliance and regional leadership.
2. Energy security: Uzbekistan's increasing energy demand also poses a risk to its energy security. The conversion to renewable energy sources constitutes a supportive element of energy security (Uzbekistan, 2022).
3. Economic Integration and Development: The development of renewable energy projects positions Uzbekistan as a source of sustainable energy. Its ability to export excess energy to neighboring countries fosters economic interdependence, leading to cooperative partnerships that amplify its regional influence.
4. Technological leapfrogging: Uzbekistan's embrace of cutting-edge renewable technologies demonstrates its commitment to innovation and progress.
5. Soft Power Projection: The commitment to renewable energy aligns with global environmental concerns. This dedication to sustainability improves the soft power of Uzbekistan and presents opportunities for regional leadership on environmental issues.
6. Regional Cooperation/Stability and Diplomacy: A stable energy supply is integral to regional stability. By enhancing its own energy security and supporting the energy infrastructure in neighboring countries, Uzbekistan actively contributes to regional harmony. Through energy exports and collaborations, Uzbekistan cements its economic role in Central Asia.

However, Uzbekistan has a few challenges in terms of renewable energy. Upgrading grids to accommodate intermittent renewable sources demands substantial investment in infrastructure (Li, 2016). The creation of harmonized regulatory frameworks for energy trade is pivotal to realizing the full potential

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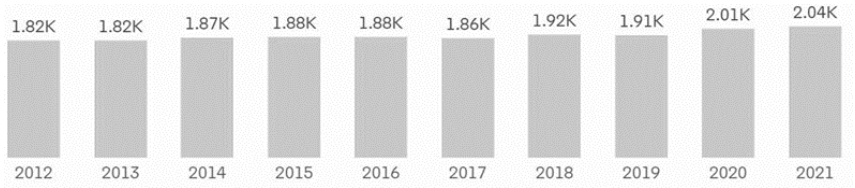
of regional cooperation. Developing domestic expertise in the technological capacity and manufacturing capabilities for renewable energy infrastructure requires focused efforts.

Although Uzbekistan has the potential to become a power due to its solar and wind power plants, it takes time to start to get ready to use and sell. Uzbekistan could become a regional power. However, in order to become a regional power, it still has a long way to go. Uzbekistan is already in a need for energy and gets most of the energy it needs from neighboring countries as follows:



Source: Mordorintelligence, IRENA

Figure 3. Uzbekistan's Renewable Energy Hydropower Installed Capacity in MW 2012-2019.

Tajikistan and Uzbekistan started a project consisting of two hydropower plants on the Zarafshan River in 2022. These two plants will generate 800 million KW. Taking into consideration these factors, Uzbekistan's investments in the hydropower sector are expected to dominate the market, which is shown in Figure 3 below. Tajikistan will help reduce the use of fossil fuel electricity and create a positive impact on the environmental situation across the Central Asian region (CASA-1000, 2023).

Uzbekistan currently receives gas from Turkmenistan due to low gas pressure and gas shortages. For this reason, Turkmenistan does not need the energy obtained from Uzbekistan.

Kyrgyzstan has been preparing to build a joint hydroelectric power plant together with Kazakhstan and Uzbekistan (Bringing Kazakhstan to the World, 2023). If we compare which country needs and buys energy from whom, we can predict that Kyrgyzstan will buy energy from Uzbekistan. Because Kyrgyzstan has a population of 5 million, and it does not seem to need a lot of capacity and is not as rich in natural resources as Uzbekistan.

Regarding Kazakhstan, which is almost 3 times the size of Uzbekistan, it is a serious regional power. In the Aktau region of Kazakhstan, there is a serious basin with oil and gas facilities. In Turkestan, the closest region of

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Kazakhstan to Uzbekistan, Samruk Energy has built a 1000 MW power plant with an investment (LITER, 2022) called PGU Turkestan.

Most of Uzbekistan's hydroelectric power plants are located in a region called Termez in the Surkhanderya region, close to Afghanistan, and there will be 15 hydroelectric power plants in 2026 (Minenergy, 2020).

Discussion and Conclusion

Producing and using renewable energy offer many advantages: First and foremost, it reduces external dependence on energy. Since they are naturally derived energies, they will neither cause fuel consumption nor will cause any air pollution. To summarize, renewable energy is equivalent to clean energy, thus having very low or no harm at all. They do not contribute to the pollution caused by fossil-fuelled power plants in electricity generation. Today, not only obtaining cheaper energy but also aiming to reduce carbon emissions makes using and having access to renewable energy become indispensable for countries in need of energy. Hydroelectric power is the most reliable among all types of renewable energy. And Uzbekistan is investing more in hydroelectric power plants more than solar and wind plants.

On the other hand, the Chinese company received a larger investment compared to the others because of their low-price offer. This means that Uzbek people can use electricity at an affordable price. However, it is also a handicap to hand over such a large amount of energy investment to a single country, which leads to the danger of being completely dependent on it. But if they diversify the investment, for example: not only focusing on solar and wind but also hydroelectric plants, and not only in certain places but also in different parts of the country, and constructing solar and wind parks, they can increase the capacity. In other words, Uzbekistan can become a regional power if it secures its energy considering its current climatic and natural conditions.

Uzbekistan's renewable energy policy is a strategic masterstroke that reaches beyond its borders, positioning the nation as a harbinger of regional transformation. By harnessing abundant renewable resources, Uzbekistan engages in economic diplomacy, improves energy security and contributes to stability in Central Asia. As the nation overcomes challenges and strengthens its renewable energy infrastructure, its status as a regional power becomes more evident.

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Furthermore, Uzbekistan's renewable energy policy is not just about sustainability; it is a blueprint to assert its influence and leadership in the heart of Central Asia.

To sum up, Uzbekistan's historical legacy as a center of culture, trade, and intellectual thought positions the nation with inherent influence in the region. Additionally, Uzbekistan can attract investment in renewable energy investment projects due to its long-term utilization and foreign currency guarantee and can become a regional power.

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