THE CONSIDERABLE POTENTIAL FOR RENEWABLE ENERGY IN THE CASPIAN REGION

SPECIAL REPORT BY THE CASPIAN POLICY CENTER

CPC CASPIAN POLICY CENTER

ABOUT US

The Caspian Policy Center (CPC) is an independent, nonprofit research think tank based in Washington D.C. Economic, political, energy, and security issues of the Caspian region constitute the central research focus of the Center.

CPC aims at becoming a primary research and debate platform in the Caspian region with relevant publications, events, projects, and media productions to nurture a comprehensive understanding of the intertwined affairs of the Caspian region.

With an inclusive, scholarly, and innovative approach, the Caspian Policy Center presents a platform where diverse voices from academia, business, and policy world from both the region and the nation's capital interact to produce distinct ideas and insights to the outstanding issues of the Caspian region.

CPC CASPIAN POLICY CENTER

ABOUT THE AUTHORS

Ambassador (Ret.) Robert F. Cekuta
Energy and Economy Program Chair

Ambassador to the Republic of Azerbaijan (2015 – 2018), Bob Cekuta has long and extensive experience as a top-level U.S. diplomat. Amb. Cekuta's positions in the State Department included Principal Deputy Assistant Secretary for Energy Resources as well as Deputy Assistant Secretary for Energy, Sanctions, and Commodities. His overseas postings included the U.S. Embassies in Berlin and Tokyo where he oversaw the full range of economic, commercial, nonproliferation, and scientific relations. In addition, Amb. Cekuta was Deputy Chief of Mission in Albania and held positions in Vienna, Baghdad, Kabul, Johannesburg, and Sana'a, Yemen.

Dante Schulz
Energy and Economy Program Research Intern

Dante Schulz is currently a research intern with the Caspian Policy Center's Energy and Economy Program. He is a junior at The George Washington University studying International Affairs and History with a focus in Asia. Academically, his focus is on the implications of the rise of China in Central Asia and the South Caucasus. Previously, Schulz interned at the International Center for Religion and Diplomacy designing and promoting interfaith peace programs in South and Southeast Asia and at the Carnegie Council for Ethics in International Affairs developing coursework for history teachers across the country.

Jeremy Cohen
Energy and Economy Program Assistant

Jeremy Cohen serves as the Program Assistant for the Energy and Economy Program at the Caspian Policy Center. He completed his B.S. at Georgetown University's School of Foreign Service with honors in International History and a minor in Russian. Cohen studied ethnic policy and conflict in Eurasia during the imperial and Soviet periods of Russian history, and Russo-British relations in nineteenth-century Central Asia. At CPC, he pursues his interest in the Caspian region's status as a political and economic crossroads both today and throughout history. He has worked previously in Kazakhstan and Ukraine, and organized non-profit educational programming in the Kyrgyz Republic.

Introduction

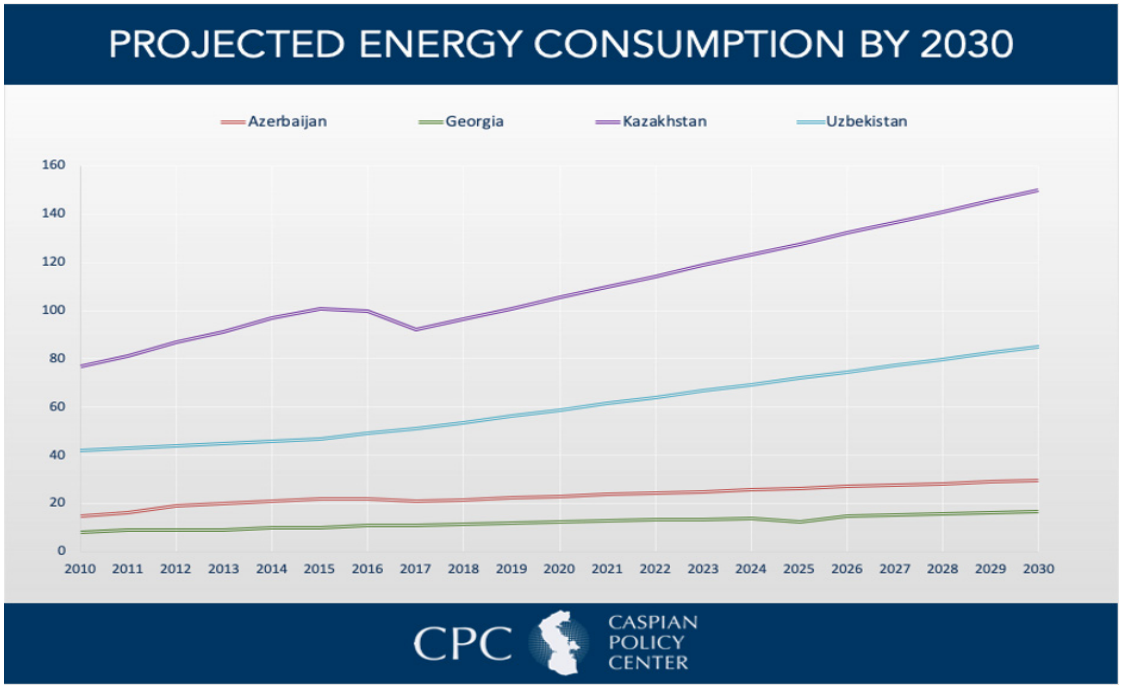
The Greater Caspian Region has tremendous wind, solar, and hydropower potential that should be harnessed to meet these countries' growing electricity needs. Long — and rightly — associated with oil and gas production, the countries of the Caspian region have been looking at and using renewables, particularly hydro. However, even a quick review of the region's significant untapped capacity argues that in addition to hydropower, decision-makers need to look more at their considerable and easily available resources for solar- and wind-generated electricity. No longer "exotic" or "untested," solar and wind technologies are established and competitive with other forms of electricity generation in terms of price as well as practicality. Utilizing these resources can create jobs and, for hydrocarbon-rich countries such as Azerbaijan, Kazakhstan, and Turkmenistan, provide needed energy while freeing up oil and natural gas for export sales. Moreover, increasing the use of renewables, factoring them into efforts to modernize national electrical grids, and developing regional strategies for supplying electricity will also help address domestic pollution concerns and lower greenhouse gas emissions. In addition, agencies such as USAID, the U.S. Export-Import Bank (EXIM), and the new U.S. Development Finance Corporation (DFC), as well as the World Bank and other international financial institutions, can help countries better capture the region's renewable energy resources.

Yeni Yashma wind farm outside of Baku | Euneighbours.Eu

A Growing Need for Electricity

Central Asian and South Caucasus countries face continued, rising demand for electricity from industrial, commercial, and individual consumers. Meanwhile, they are also often still plagued with outdated and inadequate Soviet-era components in their electrical grids. In Kazakhstan, for example, 57% of the equipment used for energy generation and transmission is outdated, and an average of 13% of energy generated is lost during transmission.[i] Unreliable electrical supplies are a major concern for businesses and can influence whether foreign firms decide to open or expand operations in a city or country. The situation is so dire that in some areas an estimated two million people across Central Asia, mostly in the Kyrgyz Republic and Tajikistan, are uncertain whether they will have electricity on any given day.[ii] The situation in Afghanistan presents even further serious challenges.

Electricity demand in the Caucasus and Central Asia grew an average of 4 - 5% annually in the years 2014 through 2018 and there are no signs it will let up. Again though, despite the growth, greater supplies are needed; electricity generation in the region was only about 270 TWh in 2018, one percent of global electricity production or roughly equivalent to just the amount of electricity produced in Indonesia alone. The need to improve the availability of assured electricity supplies for business, industry, and private consumers as economies grow and standards of living improve is apparent.[iii]



Sources: International Energy Agency, United Nations Economic Commission for Europe, Current Energy Resources in Kazakhstan and the Future Potential of Renewables: A Review, and Uzbekistan Energy/Power Sector Issues
Projected energy consumption by 2030 for Georgia calculated based on energy consumption trends between 2010 and 2017.

The Need for New Approaches

Greater utilization of renewable energy resources in the Caucasus and Central Asia is a viable way to help meet current and growing energy needs.

Globally, renewable technologies are leaders in the market for new power generating capacity. Solar photovoltaics and wind are increasingly the cheapest sources of electricity in many markets. In 2019, renewable electricity generation increased by more than the growth in overall electricity demand; generation of electricity from fossil fuels, however, decreased. Moreover, the International Renewable Energy Agency (IRENA) reports that most renewable power sources will be fully cost-competitive within the next decade.[iv] Energy companies whose primary activities long focused on oil and gas are also factoring in the global rise in renewables and decline in their cost. The International Energy Agency (IEA) reports renewable energy "has so far been the energy source most resilient to COVID-19 lockdown measures."[v] The IEA further reports the share of renewables in global energy generation jumped to nearly 28% in the first quarter of 2020, up from 26% during that same quarter a year earlier.

Major oil and gas producers elsewhere in the world are increasingly harnessing their solar, wind, and other renewable resources for power generation. The United Arab Emirates has been a leader in this regard with Abu Dhabi's Masdar clean energy city partnering with foreign governments to develop renewable energy potential. In the United States solar now accounts for 1.8% of electricity generated and wind for 7.3% and this growth looks likely to continue.[vi]

The price of installing and managing renewable energy facilities is also trending downwards worldwide. Total installed costs for solar energy dropped 79% between 2010 and 2019.[vii] Record low tenders demonstrate this drop in prices. In April 2020, Abu Dhabi accepted a joint bid by France's EDF and the Chinese company JunkoPower of $0.0135/kWh for a 1.5 GW solar power facility, the lowest tariff for solar power ever in the world.[viii]

Technological innovations are contributing to larger and more economic outputs for other renewables as well. Advances in wind turbine technology are yielding greater amounts of electricity at relatively the same cost. In the last decade, costs of wind energy generation dropped from over $100/kWh to $37/kWh in the United States.[ix]

Renewables have come into their own globally. Despite the public's tendency often to look at them mostly in the context of reducing greenhouse gas emissions and fighting global warming, the reality is that they are now a mainstream, price-competitive means for generating power and meeting rising electricity needs. It is important to recognize as well that components for renewables are significant aspects of countries' export trade portfolios.

Potential for Greater Use of Renewables in the Caspian Region

The diverse geography of Central Asia and the Southern Caucasus provides a range of options for solar, wind, and hydroelectric power. The specific circumstances in each country of the region are different, but the overall picture suggests greater potential, even in countries that have already taken steps to utilize renewables.

Azerbaijan

- In terms of hydroelectric power, Azerbaijan's potential stands at an estimated 16 billion kilowatt-hours (kWh) with about 1,100 of the country's rivers and streams able to host a hydroelectric facility. Small and micro hydropower plants show particular potential: roughly 500 million kWh could be generated by small hydropower plants.[x]
- For 250 days a year Azerbaijan has wind speeds optimal for generating power. Several wind farms in the Absheron Peninsula and along the Caspian seashore are initial steps towards capturing those resources. The total potential wind energy in Azerbaijan is an estimated 26.2 billion kWh.[xi]
- Its geography gives Azerbaijan 2,400 to 3,200 hours of sunlight per year, comparable to that of the United States and Central Asia. Solar energy could be particularly useful in providing power in the central river valleys and in the north and northwest regions of the country.
- Azerbaijan's government has committed to ensuring that 30% of its domestic power is generated using renewable energy sources by 2030. In 2020 on the margins of Davos, the government signed agreements with Saudi Arabia's ACWA Power and with Masdar in the UAE. ACWA Power will work with Azerbaijan's Energy Ministry to develop, build, and operate a 240 MW wind power project. The agreement with Masdar covers construction and operation of a 200 MW solar panel facility southwest of Baku by 2022.[xii] The Energy Ministry, which shows a significantly increased interest in renewables, also looks to boost cooperation with the National Labs under the U.S. Department of Energy; this cooperation comes on top of the Ministry's work with USAID to reform and update legislation governing the electricity market. Furthermore, the Asian Development Bank (ADB) has allocated $100,000-$200,000 to examine the potential for building a 300 KW floating solar plant on Boyuk Shor Lake by 2021.[xiii]

Azerbaijani President Ilham Aliyev attended the commissioning ceremony of a 1.1 MW PV plant near Baku in 2017. | PV Magazine

Georgia

- Georgia's abundance of river networks provides considerable opportunities for hydroelectric power. Out of the 26,000 rivers that cut through Georgia's mountainous terrain, 319 are deemed to have the potential to generate as much as a total of 135.8 billion kWh.
- Georgia's terrain allows for both high- and low-speed wind farms. Mountainous Georgia divides into four zones for developing wind energy. The mountains in southern Georgia, the Kakhaberi Valley, and parts of the Kolkheti Lowland allow for generating more than 5,000 hours of wind energy annually. Similarly, winds in the second zone, located mostly in the Mtkvari Basin, can generate wind power for 4,500 to 5,000 hours annually. The third region, primarily located in the Gagra Ridge, Kolketi Lowland, and Eastern Georgia, has potential for low-speed wind farms. The fourth zone in the Iori Highland and Sioni Reservoir could utilize the low wind speeds there for smaller-scale wind farm facilities.
- Receiving an average of 1900-2200 hours of sunlight annually, Georgia has the potential to produce 946 million kWh of solar power. Small-sized photovoltaic solar panel installations are popular with individual Georgian households, mostly for home heating and hot water.[xiv]
- The Georgian government has recognized the importance of developing renewable energy infrastructure, often in partnership with foreign investors. Since independence, 26 hydropower plants have been commissioned, with the number increasing annually. Hydropower plants' output increased 4.7% in 2017 over 2015 levels, an uptick facilitated by both domestic and foreign investment. The European Bank for Reconstruction and Development (EBRD), for example, provided $200 million in May 2015 to build the 280 MW Nenskra hydropower plant.[xv]
- Tbilisi International Airport installed solar panels capable of generating an annual average

of 337 kWh; construction was completed with the assistance of Japanese companies that invested in the project.[xvi]

- Importantly, Georgia's government has worked with domestic companies to develop renewable energy facilities. The Georgian government and a state-owned company, Georgian Energy Development Fund, signed a memorandum of understanding to prioritize the study and analysis of solar power data.

Georgia's Nenskra Dam is the country's most advanced hydropower installations in the Upper Svanetti region. | Medium

Kazakhstan

- Kazakhstan's location in northern Central Asia and the steppes that make up a third of the country give it tremendous untapped wind and solar potential. Yet, renewable energy installations account for only 0.6% of power facilities, with most of that coming from small hydropower plants.
- Its potential for wind energy is an estimated 3.1 trillion kWh based on capturing 50% of the country's winds blowing at their average speeds.
- The potential for solar power plants is 32.93 trillion kWh due to Kazakhstan's large expanses of flat terrain.[xvii]
- Kazakhstan has 62 billion kWh of potential hydropower capacity.[xviii]
- In 2012, Kazakhstan set a target of having 50% of its energy generated by renewable energy sources by 2050 with interim targets of 3% by 2020 and 10% by 2030.[xix] The government also passed a law "On Supporting the Use of Renewable Energy Sources" to accelerate production and manufacture of renewable energy facilities and technology. The law also

aims at installation of 1040 MW of renewable energy capacity by 2020. Furthermore, the government adopted new legislation in late 2017 consolidating the country's 160 energy transmission companies. The government hopes the change will improve energy reliability as it cuts the number of companies that need to be monitored.[xx]

- The European Bank for Reconstruction and Development committed up to $6.4 million in September 2019 to finance a new solar plant in Kazakhstan. The plant is expected to reduce carbon emissions by about 13,000 tons annually.[xxi] The EBRD also signed a memorandum of understanding in September 2019, reaffirming support for Kazakhstan's renewable energy projects. As of September 2019, the EBRD had invested roughly $9.1 billion in 262 projects in Kazakhstan.[xxii]
- Inefficient bureaucracy and the need for cooperation with its neighbors have been cited as factors in slowing Kazakhstan's development of its renewable energy capabilities.

Kazakhstan's flat terrain provides optimal space and wind speeds for wind farms. | European Bank for Reconstruction and Development

Uzbekistan

- Uzbekistan is one of the region's countries richest in renewable energy resources. Its annual hydro energy potential is an estimated 27.5 billion kWh.[xxiii] Its potential for wind is 14 billion kWh and 5.19 trillion kWh for solar.
- Roughly half of Uzbekistan's population lives in rural areas, amplifying issues surrounding energy reliability and delivery.[xxiv] At the same time, these are the parts of the country most capable of generating electricity through renewables given that they have the highest wind speeds, and the most sunlight and natural water sources.

- The government pledged in 2020 to raise its initial target of requiring 10% of Uzbekistan's electric energy to be generated by renewables. The new goal calls for renewable resources to supply 25% of the country's electricity by 2030.[xxv] In 2019, government goals called for hydropower's share in generating electrical production to rise from 12.7% to 15.7% by 2025 with plans to construct 42 new hydropower plants. Moreover, the government plans to modernize 31 existing plants by 2021 to improve efficiency and quantitative output. Other goals seek to raise the share of electricity generated by solar to 2.3% and by wind to 1.6% by 2025.[xxvi]
- Newly established renewable energy enterprises in Uzbekistan can qualify for exemptions from property taxes and profit taxes for between three and seven years if the share of the foreign investor's capital exceeds 33%.[xxvii] The initiatives to attract foreign financing appear to be working as 23 companies from China, France, India, Japan, Norway, Russia, Saudi Arabia, South Africa, South Korea, Spain, and the United Arab Emirates participated in the first stage of the international tender to construct a 100 MW power plant in Uzbekistan's Navoi region.

Uzbek and U.S. officials discussed how to accelerate clean green energy in Uzbekistan. | U.S. Embassy in Uzbekistan

Potential of Renewable Energy in the Caspian Region

	Hydro	Wind	Solar
Azerbaijan	16 TWh	26.2 TWh	202 TWh (2,400-3,200 hours)
Georgia	135.8 TWh	12.7 TWh	0.95 TWh (1,900-2,200 hours)
Kazakhstan	62 TWh	3,100 TWh	32,930 TWh (2,200-3,000 hours)
Uzbekistan	27.5 TWh	14 TWh	5,190 TWh (2,410-3,090 hours)

* *Hours of sunlight per year denoted in parenthesis.*

Foreign Partner Support

Foreign governments and international financial institutions can and do provide Caspian countries with financial and technical support facilitating capture of their renewable energy resources. USAID has long worked with Central Asian and Caucasus counties on energy matters, partnering with various countries in the region to complete specific renewables projects, to develop their energy markets, and to establish needed frameworks and systems. One such project is development of renewable energy options in Kazakhstan. The new U.S. Development Finance Corporation has a specific mandate to promote exports of renewable energy technologies. EXIM has a specific focus on offering competitive financing terms to international buyers for the purchase of U.S.-made environmental goods and services, e.g., renewable energy equipment and energy efficiency technologies. Additionally, boosting renewable power generating capabilities can include upgrading existing turbines and systems in existing hydroelectric facilities as well as building new solar arrays or wind turbines.

The World Bank, the Asian Development Bank, and the European Bank for Reconstruction and Development are all active in the region as well. Their programs have included specific support for renewable energy projects as well as programs to upgrade and modernize grids, including steps to strengthen their management.

But It's Not All Smooth Sailing

Hurdles remain to harnessing fully the Caspian region's renewable energy wealth despite improving technologies, lower prices for wind and solar power and growing attention to these sources elsewhere in the world by governments and the boards of international corporations as they seek to respond to pressures to cut CO2 and other emissions. While a frequently cited worry about renewables is concern about managing flections in supply due, for example, to weather, a greater negative factor may be the innate conservatism in the relevant government institutions as well as among managers in the region's power companies.

Countries of the Greater Caspian Region are not unique in dealing with these problems. Studies show several factors can impede state-owned enterprises from moving ahead confidently with renewables. These factors include risk-averse business cultures, domestic political dynamics that enable or perhaps even encourage them to resist moving away from fossil-fuel power generation, weak government commitment to utilizing renewable energy, and dynamics where a short-term focus on the availability of electricity from high-carbon assets win out over renewables.[xxviii]

Again, these factors need to be recognized and addressed if the countries of the region are to benefit fully from the renewable energy resources at hand, but experience shows they are also factors that can indeed be overcome. Being stuck in old-think has costs; building a fossil fuel-fired plant today means living with that decision for the 35 or more years the plant can be expected to be in operation.

Recommendations

In moving ahead and capturing the benefits of the renewable energy resources in the countries of the Greater Caspian Region, the following actions are necessary:

- **Conduct full and detailed inventories of the wind, solar, and hydro resources.** By thoroughly investigating the energy potential cost-benefit evaluations of how economical it would be to exploit them, each of the region's countries can take the first step to effectively taking advantage of these resources. Given changes in technology and costs, studies done years ago may well need updating.
- **Play to local advantages**. Each country in the region is different with differing needs as well as differing types and levels of renewable energy resources. Some of the countries are also quite large geographically. Particular regions within a country may face specific needs, such as the need to cut pollution from coal-fired plants in Almaty. Nakhchivan's geography makes it a good candidate for further solar power facilities.

Kanat Bozumbayev, Kazakhstan's energy minister, tours a solar farm in Karaganda in 2019, PV Magazine

- **Don't just think big**. Like the United States and western Europe, countries in the region have considerable stocks of older buildings. Retrofitting these buildings, for example, for solar power would create jobs as well as boost energy supplies and cut harmful emissions.
- **Follow through with projects that have been on the board and show the public the resulting benefits**. After he took office, for example, Azerbaijan's Energy Minister, Shahbazov saw the completion of solar projects near the capital and their incorporation into the supply grid, yielding 200 MW of power.
- **Collaborate with neighboring countries**. Communicating and cooperating among the region's countries is important to boost efficiencies and improve supplies. As elsewhere in the world, political borders in the Caspian region often do not follow the geographical terrain. Moreover, some cities are closer to a neighboring state than to their own national capital. Strengthened communication can usefully take place at the municipal/sub-national level as well as among the region's utilities and academics.
- **Include renewables in discussions on the needed modernization of existing transmission systems**. Plans call for updating/upgrading transmission systems in a number of countries. Modernized electrical grids are key for effective utilization of wind and solar and factoring these renewables into the modernization of grids will yield economic as well as energy security and environmental benefits.

- **Use energy policy, and renewables in particular, as a platform for regional cooperation**. Building further cooperation among the countries of the region in energy matters will boost efficiencies and improve supplies. Moreover, dialogue and cooperation among these countries on power generation and supply can offer a path to improved relations for dealing with other issues, such as disagreements over use of critical water resources, and can thereby strengthen stability in the region.
- **Take advantage of foreign support for renewable energy projects**. International financial institutions, as well as the EU and its member governments, have resources to boost the development of renewables as part of their overall lending programs as well as their efforts to cut greenhouse gas emissions. United States government, for example, through USAID, the new DFC (formerly OPIC), and EXIM has programs to help countries take advantage of green technologies. The benefits of this aid have already become apparent in Azerbaijan and Uzbekistan, where there are a multitude of new projects under construction to improve power reliability in the region.

Conclusion

The great potential for renewable energy in the region provides a crucial – and not fully utilized – avenue for addressing its energy problems. The examples of Azerbaijan, Georgia, Kazakhstan, and Uzbekistan show a diverse landscape in the region that provides the optimal wind speeds, sunshine, and water sources to produce electricity with available and efficient technologies. Caspian countries have already moved towards better employing these resources and technologies, often by engaging with foreign entities. The goals, quotas, and laws some of the countries in the region have established are moves in the right direction, but just a start in terms of what could be realized. Much more can be done.

Endnotes

[i] Aldayarov M., Dobozi I., & Nikolakakis T. (2017). Stuck in Transition: Reform Experiences and Challenges Ahead in the Kazakhstan Power Sector. World Bank Group, p. 30.

[ii] Shadrina, E. (2019). Renewable Energy in Central Asian Economies: Role in Reducing Regional Energy Insecurity. Asian Development Bank Institute.

[iii] Ichord, Jr. R. F. (2020, February) "Renewable Energy and the Future Caspian Electricity System. Caspian Affairs Magazine, (4), 24 - 25.

[iv] Global Renewables Outlook Energy Transformation 2025, p.18.

[v] Global Energy Review 2020 (renewables).

[vi] What is U.S. electricity generation by energy source? (2020, February 27). U.S. Energy Information Administration. Retrieved from https://www.eia.gov/tools/faqs/faq.php?id=427&t=3.

[vii] Renewable Power Generation costs in 2019. (2020). International Renewable Energy Agency.

[viii] Bellini, E. (2020, April 28). Abu Dhabi's GW tender draws record low solar bid of $0.0135 kWh. PV Magazine. Retrieved from hits://www.pv-magazine.com/2020/04/28/abudhabi's-2gw-tender-draws-the-world-record-solar-bid-of0-0135-kwh/.

[ix] Eckhouse, B. Solar and Wind Cheapest Sources of Power in Most of the World. (2020, April 28). Bloomberg Green. Retrieved from https://www.bloomberg.com/news/articles/2020-4-28/solar-and-wind-cheapest sourceswof-power-in-most-of-the-world.

[x] "Bulut, C., Suleymanov, E. & Vidaddili, N. (n.d). Transition to Renewable Energy and Sustainable Energy in Azerbaijan. Qafqaz University.

[xi] Renewables Readiness Assessment Republic of Azerbaijan. (2019). International Energy Agency.

[xii] UAE's Masdar and Saudi Arabia's Acwa Power sign renewables deals in Azerbaijan. (2020, January 10). The National. Retrieved from https://www.thenational.ae/business/energy/uae-s-masdar-and-saudi-arabia-s-acwa-power-sign-renewables-deals-in-azerbaijan-1.962259.

[xiii] Mehdiyev, M. (2019, April 11). Renewable Energy Could Be The Next Big Thing For Azerbaijan. Caspian News. Retrieved from https://caspiannews.com/news-detail/renewable-energy-could-be-the-next-big-thing-for-azerbaijan-2019-4-11-36/.

[xiv] Chomakhidze, D., & Melikidze, M. (n.d.). Renewable Energy Potential and Its Utilization in Georgia. Journal of Environmental Science and Renewable Resources, 2(2), 105.

[xv] Poindexter, G. (2016, February 19). Georgia and Iran announce framework for building hydroelectric facilities. Hydro Review. Retrieved from https://www.hydroreview.com/2016/02/19/georgia-seeking-iran-s-investment-in-building-hydroelectric-power-plants/#gref.

[xvi] Chomakhidze, D., & Melikidze, M. (n.d.). Renewable Energy Potential and Its Utilization in Geor-gia. Journal of Environmental Science and Renewable Resources, 2(2), 105.

[xvii] United Nations Development Programme (2013).

[xviii] Schwarz, N. (2015). Republic of Kazakhstan — Hydropower for a Huge Country. Andritz. Retrieved for https://www.andritz.com/hydro-en/hydronews/southeast-asia/kazakhstan-hydropower.

[xix] Kazakhstan puts focus on renewable energy. (2018). UNECE. Retrieved from https://www.unece.org/info/media/news/sustainable-energy/2018/kazakhstan-puts-focus-on-renewable-energy/doc.html.

[xx] Selezneva I. (2017, December 14). Kazakhstan to consolidate energy transmission companies by 2022. The Astana Times. Retrieved from https://astanatimes.com/2017/12/kazakhstan-to-consolidate-energy-transmission-companies-by-2022/.

[xxi] Usov, A. (2019, September 26). EBRD and Green Climate Fund commit up to US$ 6.4 million to finance new solar plant in Kazakhstan. European Bank for Reconstruction and Development.

[xxii] Usov, A. (2019, September 13). EBRD extends renewable energy programme for Kazakh-stan. European Bank for Reconstruction and Development.

[xxiii] Khasanov, K (2019, October 1). Hydro electric development in Uzbekistan. Water Power Maga-zine. Retrieved from https://www.waterpowermagazine.com/features//futurehydro-development-in-uzbekistan-7433524/.

[xxiv] United Nations Development Programme (2013).

[xxv] Interest of foreign investors in renewable energy projects in Uzbekistan is growing. (2020, March 13). UZ Daily. Retrieved from http://www.uzdaily.com/en/post/55372.

[xxvi] Ichord, Jr., R. F. (2020, February). Renewable Energy and the Future Caspian Electricity System. Caspian Affairs Magazine, (4), 22-27.

[xxvii] Tax and Investment Guide Uzbekistan. (2017). Deloitte. Retrieved from https://www2.deloitte.com/content/dam/Deloitte/kz/Documents/uzbekistan/UZTaxand%20InvestmentGuideENG.pdf.

[xxviii] Benoit, P. (2019) State-owned Enterprises: No Climate Success Without Them. Journal of Interna-tional Affairs, 73(1).

1015 15th ST NW, SUITE 380
WASHINGTON, DC 20005
202.846.6958
INFO@CASPIANPOLICY.ORG
CASPIANPOLICY.ORG

CPC  CASPIAN POLICY CENTER