

COP29: DECARBONIZATION & MILESTONES IN THE SOUTH CAUCASUS RENEWABLES MARKET

DOI: 10.58867/FYUY4517

Energy is foundational to the self-perception of states in the South Caucasus. This region's post-Soviet regionalization revolves around the "contract of the century" and the export of fossil fuels to Europe. Türkiye is the biggest regional energy market, striving to balance decarbonization with the objective of maintaining cost-effective energy as an independent variable in the development of a globally competitive manufacturing hub. Azerbaijan is striving to overcome its singular dependence in fossil fuels, while retaining its role as a major energy exporter. Central to Türkiye and Azerbaijan's plans is Georgia, a country that has largely achieved decarbonization but is striving to maintain its role as the region's essential energy transit hub. Finally, Armenia continues to prioritize security over connectivity in the emerging energy landscape. This paper explores the friction of decarbonization with the role of each state in the Caucasus, focusing on milestone project investments in renewables.

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Keywords: Decarbonization, Renewables, Grid,
Interconnectors, EU, South Caucasus.



TPQ

Summer 2024

Change, Security, and Sustainability in Energy

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Baku is hosting the UN Conference of the Parties 29 Summit in November 2024. Thirty years following the “contract of the century” (1994), Baku placed Azerbaijan on Europe’s energy map and aspired to take on a role in transforming the energy status quo.¹ The annual meeting has taken place since 1995, to take stock of climate developments and focuses minds on the reduction of greenhouse gases. The objective set in Paris (2015)² is reducing global carbon emissions to “net zero” and working to subdue the now undeniable global warming effect to 1,5 degrees Celsius. During the last COP 28, in Dubai, the parties reached the so called “UAE Consensus,” namely the need to transit away from fossil fuels. To reach that point, the global economy will have to commit no less than \$41 trillion in additional investment, a requirement unlikely to be met at current pace. The “finance summit” in Baku focuses precisely on this funding gap. Azerbaijan aims to push the benchmark of support for developing economies beyond the \$100bn a year agreed in 2009.³ Taking a step back from a global perspective, this paper looks at the South Caucasus, focusing on key energy projects indicative of how regional politics matter in the global picture. The focus is not on “renewables” but on game-changing projects that are significant for the role of the South Caucasus on the broader energy map.

A Regional Perspective to Global Challenges

Worldwide, energy policy politics brings two priorities in friction to the fore: consumption security and environmental sustainability. One of the most significant advances in the energy transition campaign has been operationalizing the principle the “polluter pays” principle.⁴ The ‘carbon price’ notion assumes that states and corporates recognize and internalize the social cost of greenhouse gasses. Corporates and, ultimately consumers will pay a tax designed to penalize the use of fossil fuels and incentivize a rapid decarbonization. That is the window to relativizing the objectives in a regional and national context, making them responsive to the specific

1) “Contract of the Century,” Ministry of Energy of the Republic of Azerbaijan. See https://minenergy.gov.az/en/neft/esrin-muqavilesi#:~:text=A%20'Production%20Sharing%20A_historical%2C%20political%20and%20international%20importance; Robert F. Cekuta, “25 Years After ‘The Contract of the Century,’: the Implications for Caspian Energy,” Energy Academic Group, Naval Postgraduate School. See <https://nps.edu/web/eag/25-years-after-the-contract-of-the-century-the-implications-for-caspian-energy>

2) “What is COP?” McKinsey, 12 August 2024.

See <https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-cop>

3) “Azerbaijan outlines COP29 priorities, to launch climate finance fund,” S&P Global, 17 September 2024.

See <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/energy-transition/091724-azerbaijan-outlines-cop29-priorities-to-launch-climate-finance-fund>; “COP29 – Azerbaijan,” 11-24 November 2024. See <https://www.cisl.cam.ac.uk/cop-climate-change-conference/cop29-azerbaijan-11-24-november-2024>; “CP29 – Energy Transition Initiatives”. See <https://cop29.az/en/green-energy-transition-initiatives>

4) “What is the polluter pays principle,” 18 July 2022. See

<https://www.lse.ac.uk/granthaminstitute/explainers/what-is-the-polluter-pays-principle/>

circumstances of the economy.⁵ The policy assertion is that the cost of transition is ultimately a matter of scale, as investment has a snowball effect, in that technologies deployed at scale become cheaper. To achieve this front-ended investment is required in infrastructure, re-skilling, and rebuilding energy value chains. The skyrocketing of fossil fuels since Russia's invasion of Ukraine triggered inflation, energizing policy resolve to achieve a transition away from fossil fuels.⁶ In this scheme, Azerbaijan finds itself in a peculiar position.

On the one hand, the country is uniquely situated to benefit from its role as an alternative to Russia's producer of fossil fuels. On the other hand, the country faces an existential challenge given its reliance on fossil fuels. With the exception of the UAE, there is no country reliant on fossil fuels that is clearly en route to transition to a more diversified economy.

Azerbaijan's role as an alternative source of natural gas for Europe is particularly important to Southeast Europe, Italy and, perhaps in time, Central Eastern Europe.⁷ At present, this partnership is fundamental for the European Single Market, which in losing Russian supplies sustained a massive erosion in its manufacturing competitiveness, resulting in massive divestment.⁸ Until the invasion of Ukraine, natural gas had been considered a competitively priced "transitional fuel," with lower emissions and at competitive pricing. The sudden price hike pressed many states to reinstate coal fire infrastructure and seek new energy partners for the short-to-medium term, including Azerbaijan. Baku's relies on fossil fuel exports for exports and domestic consumption.⁹ As argued by Atlantic Council analysts John Roberts and Julian Bowden, Azerbaijan wants to maintain or scale up exports to take full advantage of current high energy prices, but oil supply is dwindling and proven natural gas reserves cannot reach the market without additional investment, which has not been forthcoming. Regulation over methane leaks may soon mount pressure on states to step away from natural gas, further accelerating divestment from fossil fuels.¹⁰ Baku is looking to substitute domestic electricity consumption

5) Hayley Dunning, "Kenya launches 2050 Calculator to advance climate change mitigation," Imperial, 22 July 2022. See <https://www.imperial.ac.uk/news/238438/kenya-launches-2050-calculator-advance-climate/>; "Decarbonising the energy system by 2050 could save trillions – new Oxford study," University of Oxford, 14 September 2022. See <https://www.ox.ac.uk/news/2022-09-14-decarbonising-energy-system-2050-could-save-trillions-new-oxford-study>

6) Mekala Krishnan et. al, "The economic transformation: what would change in the net-zero transition," McKinsey, 25 January 2022. See <https://www.mckinsey.com/capabilities/sustainability/our-insights/the-economic-transformation-what-would-change-in-the-net-zero-transition>

7) "Gabriel Gavin, Gavin Federica di Sario, Victor Jack, "EU wants Azerbaijan to fuel Russian gas pipeline in Ukraine," Politico, 13 June 2024. See <https://www.politico.eu/article/eu-asks-azerbaijan-replace-russian-gas-transit-deal-ukraine-expiring/>

8) Ilya Roubanis, "Achim Wambach: Energia, Il Problema Tedesco, Gli Stati Generali," 20 December 2023. See https://www.glistatigenerali.com/energia-economia-reale_geopolitica/achim-wambach-energia-il-problema-tedesco/

9) IAE Energy Profile, "Azerbaijan". See <https://www.iea.org/reports/azerbaijan-energy-profile/overview>

10) Blaine Friedlander, "Liquefied natural gas footprint is worse than coal," 3 October 2024. This is the reality.

with renewable electricity, thereby releasing natural gas supply for exports in the short run. This energy substitution generates the revenue requires to further invest in renewables, paving the way from energy diversification to decarbonization.¹¹ In this scheme, the global system appears to be working in that it scopes the direction of regional investment by reducing available capital for upstream investment in fossil fuels, even as demand is pressing.¹²

Even before the Russian invasion of Ukraine, Georgia's place on the South Caucasus map was a key transit hub, a conduit for energy, transport, and trade.¹³ Georgia has been a gateway to the European Single Market for landlocked states, not only due to geography, but also because Armenia has been for decades in a continuous state of war with Azerbaijan and its borders with Türkiye are sealed. Georgia, therefore, has a regional fossil fuel transit monopoly on Türkiye and Southeast Europe, as well as Russia and Armenia.¹⁴ The same conditions frame the transborder electricity distribution network. Georgia lies at the epicenter of the Black Sea Transmission Network (BSTN), bridging regional producers to Türkiye and, further afield, the Single Market.¹⁵ The country's Association Agreement with the EU means that Georgia is also significant for investment in electricity generation. Tbilisi has assimilated regulatory standards governing public-private partnerships, environmental sustainability, public engagement, accountability, and oversight.¹⁶

Azerbaijan, Georgia, and Türkiye's longstanding partnership have set significant regionalization precedents. Türkiye has a prevalent role in the energy map of the South Caucasus¹⁷ both as a market and an investor. The 17th biggest economy in the

See <https://news.cornell.edu/stories/2024/10/liquefied-natural-gas-carbon-footprint-worse-coal>

11) John Roberts and Julian Bowden, "Caspian contributions to energy security in Europe," Atlantic Council Global Energy Centre: Issue Brief, July 2024. See <https://www.atlanticcouncil.org/wp-content/uploads/2024/07/Caspian-contributions-to-energy-security-in-Europe.pdf>

12) Ilya Roubanis, "Why the oil-producing Azerbaijan needs renewables: an interview with John Roberts," Caucasus Watch, 4 March 2024. See <https://caucasuswatch.de/en/interviews/why-the-oil-producing-azerbaijan-needs-renewables-an-interview-with-john-roberts.html>

13) Zaal Anjaparidze, "The Second Karabakh War and Georgia's Threatened Transit Role," Eurasia Daily Monitor (Jamestown Foundation), 16 February 2021. See <https://jamestown.org/program/the-second-karabakh-war-and-georgias-threatened-transit-role/>; Irakli Danelia, "Prospects of Development of Georgia's Transit Function and Its Impact on the Country's Economy," *Globalisation and Business*, Vol 4., No. 7, 2019. <https://eugb.ge/index.php/111/article/view/187>

14) "Georgia Country Profile," IEA, <https://www.iea.org/reports/georgia-energy-profile/energy-security>; "Transit role of Georgia in energy has been strengthened – Economy Minister," Business Media, 4 April 2024. See <https://bm.ge/en/news/transit-role-of-georgia-in-energy-has-been-strengthened-economy-minister>; Tamar Tsurtsumia, "Electricity Cooperation Opportunities in the South Caucasus: The Role of Georgia," Energy Charter Secretariat (Knowledge Centre). https://www.energycharter.org/fileadmin/DocumentsMedia/Occasional/Electricity_in_South_Caucasus.pdf; Murman Margvelashvili, "Georgia and its role in energy transit towards the West," WEG, December 2011. See <https://weg.ge/sites/default/files/georgia-and-its-role-in-energy-transit-towards-the-west-final.pdf>

15) Black Sea Transmission Network Project (BSTN), <https://www.gse.com.ge/M9LtvI2EQCCNYg7LvHW0JQ.html>

16) "Energy system Transformation: Georgia," IEA, <https://www.iea.org/reports/georgia-energy-profile/energy-system-transformation>

17) World Bank, "Türkiye Country Profile,"

world has an ever-broadening industrial base and the profile of an emerging economy ready for a ‘demographic dividend.’¹⁸ Türkiye needs energy. In the post-Soviet space of the 1990s, Turkish policy focused on turning the country into a fossil fuel estuary, streaming the flow of fossil fuel “tributaries” from the Caspian, Russia, and the Middle East. The knock-on effect for Türkiye has been an ultra-competitive domestic energy market, adding to the country’s unique value proposition for advanced manufacturing, along with preferential market access, competitive labor costs, and surging purchasing power. To retain its competitive momentum, the Turkish economy needs to address the ailments of emerging economies, including a volatile exchange rate and sizable trade deficits. The dash for renewables is of existential significance.

Finally, Armenia is experiencing an energy market transition wrapped in a geopolitical transition. Given its closed borders with Türkiye and in a continuous state of war with Azerbaijan, the country could not engage in the regionalization of critical energy infrastructure during the 1990s and 2000s. For decades, the country has relied entirely on Russia, with oil and gas transiting via Georgia. Part of this singular reliance on Russia was reflected in the ownership of the national grid by a Russian company (Inter RAO) and, in time, the Russian-Armenian businessman Samvel Karapetyan. Investment in energy generation will require liberalization, reviewing the reliance on a privately held monopoly over the transmission network, which the government criticizes for its failure to modernize and threatens with nationalization.¹⁹ Armenia’s network seclusion has encouraged a strategy of self-reliance, which includes investment in renewables (hydroelectric, wind, solar) and nuclear power. The high baseline level of natural gas prices should have accelerated investment in renewables, to increase the resilience of Armenian energy security.²⁰ However, even as the country pioneered the first wind farms,²¹ the country remains an investment laggard. Domestic production continues to rely on traditional and tested technologies, such as hydroelectric and nuclear energy, which in 2021 accounted for 28 percent and 25 percent of the energy mix respectively.²² Regulatory barriers constrain plans to scale up investment – the single buyer model – the need for grid modernization and

[https://www.worldbank.org/en/country/turkey/overview#:~:text=T%C3%BCrkiye%20is%20the%2017th,official%20development%20assistance%20\(ODA\)](https://www.worldbank.org/en/country/turkey/overview#:~:text=T%C3%BCrkiye%20is%20the%2017th,official%20development%20assistance%20(ODA))

18) Zuzanna Krzyzanowska, “Turkey: a looming demographic crisis,” OSW, 8 July 2024. See <https://www.osw.waw.pl/en/publikacje/osw-commentary/2024-08-07/turkey-a-looming-demographic-crisis#:~:text=The%20median%20age%20rose%20from,over%2065%20accounted%20for%2010.2%25>

19) Arshaluys Barseghyan, “Armenian government attacks on electricity supply lead to nationalisation rumours,” OC Media, 10 October 2024. See <https://oc-media.org/armenian-government-attacks-on-electricity-supply-lead-to-nationalisation-rumours/>

20) “Armenia Least Cost Energy Development Plan (2020-2036): Market Liberalisation and Electricity Trade (MLET) Program,” November 2019. See http://energinst.am/files/LCEDP%20Report_with%20Append_Eng_forSRIE.pdf

21) Armenian Calling: a new frontier for renewable energy,” Haig and Barrett Partners, 2024. See <https://www.haigbarrettpartners.com/podcasts-blog/armenia-calling-a-new-frontier-for-renewable-energy>

22) “Nuclear Power in Armenia,” World Nuclear Association, 10 May 2024. See <https://world-nuclear.org/information-library/country-profiles/countries-a-f/armenia>

geopolitical risk.²³ A key variable to the country's energy security is the question of its nuclear energy capacity.²⁴ Without the regionalization of its grid infrastructure, Armenia does not appear to have a viable pathway towards net-zero.

Seeking a Role in the South Caucasus

The South Caucasus shares the classic policy trilemma of maintaining energy security in the present, investing in renewables production for the medium-to-long term, and preventing the erosion of competitiveness. These are difficult priorities to square. Much depends on the concept of “grid parity,” or the dropping of production costs for renewables to equal or lower price levels than fossil fuels to incentivize investment in renewables.²⁵ This objective has been achieved for key renewable technologies such as solar and wind in regions with well-developed grid infrastructure, notably in China, California, or Europe. Distribution is key because many of these technologies produce energy that is “intermittent” rather than dispatchable²⁶ or, in other words, energy that is not available on demand, where it is needed, seven days a week. This challenge can be addressed by scaling up storage capacity or investing in smart grids that balance demand and supply across broader geographical areas.²⁷ As we are nearing the COP29 in Baku, it is important to see how local geopolitical conditions combine with global regulatory regimes to facilitate or disrupt energy transition.

Case Study 1. Türkiye's Geothermal Power

Türkiye is seeking a roadmap to evolve its competitive advantage in energy pricing. Despite surging electricity consumption, Türkiye has been able to build an energy mix with a 50 percent share of renewables. That is highly reliant on hydroelectricity production, a source that may become less reliable as European water resources are dwindling, precipitation is dropping, and evaporation is increasing. Solar and Wind are gaining ground and will continue at pace to set the tone in renewables investment as battery technology is scaling up. However, the question of securing reliable sources of baseload energy is urgent.

One direction Türkiye could look to for baseload energy is geothermal, a choice

23) IEA Country Profile. “Armenia.” <https://www.iea.org/reports/armenia-energy-profile/overview>

24) IAEA, “Armenia: Nuclear Power Country Profile,” See <https://cnpp.iaea.org/public/countries/AM/profile/highlights>

25) Robin Whitlock, “BNEF: solar and wind reach parity with power prices in California, China, and parts of Europe,” Panorama, 29 October 2019. See <https://www.renewableenergymagazine.com/panorama/bnef-solar-and-wind-reach-parity-with-20191029>.

26) Why ‘Grid Parity’ is a Meaningless Concept, Institute for Energy Research. See <https://www.instituteforenergyresearch.org/grid-parity-meaningless-concept/>

27) Karl Mathiesen et al., “A new inconvenience truth: Europe’s global plans all require money no one has,” Politico, 17 April 2024. See <https://www.politico.eu/article/europe-global-plans-money-green-economy/>

that is anything but obvious in comparative perspective. With 63 geothermal plants, this sector barely covers 3-4 percent of Türkiye's total electricity generation (1,7 GW: 2023, 3GW est. 2030 installed capacity). In the words of the energy investment advisor, Ardic Akcin,²⁸ "this is the most viable path to renewable baseload energy; it may not replace natural gas, but it could go a long way to reduce energy imports." Indeed, the contribution of geothermal in Türkiye's energy mix should be set in context. For a country like Türkiye, the small contribution of geothermal energy to the overall energy mix is quite significant and corresponds to 11TW, or 5bcm of imported natural gas. While it is true that the use of closed loop systems to generate electricity from deep geothermal plants is rare in Europe, Türkiye has unmatched potential. According to the Head of Policy of the European Geothermal Energy Council, Sanjeer Kumar, "Türkiye should be a global leader (...) but to move forward geological potential needs to be matched by industrial vision." West Anatolian geology means that Türkiye has explored less than 10 percent of its proven capacity. However, to explore its capability at scale, "they should be producing their pumping technology," Kumar argues.

Once developed, geothermal units can provide returns for a century rather than a maximum of 12-years that solar panel fields. Unlike solar panels, which are baseload energy, dispatchable on demand, and more resilient to climate change than hydroelectric power generation. European standards still matter, as Türkiye must mitigate the challenge of sulfur emissions to retain geothermic energy within the green energy taxonomy's scope and ensure the energy source's social sustainability. From an investors' perspective, policy planning is challenging. Drilling and exploration are capital-intensive processes that requires a commitment of eight to ten years. De-risking is necessary. While Türkiye's Renewable Energy Resources Support Mechanism (YEKDEM) did provide a guaranteed feed-in tariff from 2005 to 2020 close to the 12 Cents/KW that international financial institutions consider viable, the country's currency crisis took its toll on the overall investment climate. In December 2020 the government de-dollarized guaranteed feed-in electricity tariffs, exposing the sector to the friction between hard-currency-denominated liabilities and Turkish lira-denominated revenue. According to Ufuk Şentürk, the chair of the National Geothermal Power Plant Investors' Association, the de-risking strategy is back on track. Since May 2023, the dollar denomination of feed-in tariffs was restored. In addition, the government the Development and Investment Bank of Türkiye (TKYB) is backing a drilling fund, with the state sharing both in the risk and the premium of deep geothermal exploration.

28) See <https://ardicakcin.com/>

Case Study 2. Georgia's Hydropower & Transit Potential

Türkiye has historically been one of the biggest investors in Georgia's hydroelectric energy generation. The country's 300 rivers provide a reliable baseload electricity source, which can rely on tested technology to generate cost-effective dispatchable energy for decades. Hydropower is the world's leading renewable energy source, and Georgia is well-positioned to become a regional superpower. In the words of Mathew Bryza, "Georgia's hydroelectric potential is second only to Norway's in Europe." The country's 300 rivers currently power is estimated to hold the production capacity of 50TW. Over 85 percent of the country's electricity generation is hydro generated although only 22,5 percent of the estimated potential is exploited.²⁹ The disruption of hydro-ecosystems for energy production is controversial³⁰ on several fronts, including issues with the flow of migratory fish and silt necessary to replenish agricultural soil, not to mention the flooding of local settlements. Georgia has sustained its own shared of controversy.³¹ From an investors' perspective, as in the case of geothermal, once developed, the development of hydroelectric energy requires a long-term commitment, upfront capital investment, and a tumultuous process of stakeholders' management.³² Timeline and cost overruns are the rule rather than the exception. With each passing year, however, Georgia acquires the capacity for electricity exports on scale.

Starting from a low threshold of hydroelectric capacity exploration means that additional capacity adds to the attraction of Georgia both as a manufacturing investment destination and to the overall capacity to export cost-effective "dispatchable" electricity. This capacity is only theoretical unless a grid is available that can sustain and carry this electricity to market. From an investors' perspective, the Executive Director of the EU-Georgia Business Council Giorgi Kacharava, suggests that the national grid's capacity and resilience have been bolstered, with projects such as the Jvari-Khorga Interconnection. Both business representatives and the member of the board of directors of Georgia's electricity transmission grid company (JSC Georgian State Electrosystem), Dr Zviad Gachechiladze, point to political resolve reflected

29) "Georgia country profile," IEA. <https://www.iea.org/reports/georgia-energy-profile/energy-security>

30) Jeff Operman, "Contradictions within Global Goals for Hydropower and Sustainable Energy," Forbes, 14 December 2023. See <https://www.forbes.com/sites/jeffopperman/2023/12/14/contradictions-within-global-goals-for-hydropower-and-sustainable-energy/?sh=1a8753c13086>; Jeff Operman, "Reducing Hydropower Investment Risk Depends on Minimizing Social and Environmental Risks," Forbes, 27 March 2024. See <https://www.forbes.com/sites/jeffopperman/2023/12/14/investment-risk-for-hydropower-depends-on-minimizing-social-and-environmental-risks/#:~:text=A%20study%20by%20EY%20found,average%20overrun%20of%2060%20percent>

31) "Hydropower development in Georgia," Bankwatch Network. See <https://bankwatch.org/project/hydropower-development-georgia#project-publications>; Judith Plummer-Braeckman, Sanna Markkanen, "Perceptions of risk in relation to large hydropower projects: a finance perspective," University of Cambridge Institute for Sustainability Leadership. See <https://www.cisl.cam.ac.uk/system/files/documents/future-dams-working-paper-risk-2.pdf>

32) "Challenges for hydropower-based National Determined Contributions," UCL Discovery. See <https://discovery.ucl.ac.uk/id/eprint/10081761/1/Carvajal%20and%20Li%202019%20-%20Challenges%20for%20hydropower-based%20nationally%20determined%20contributions.pdf>

in the government's 10-year Network Development Plan of Georgia (2023-2033). For Georgia, the objective is to both attract investment in Georgia and to evolve and maintain its nation-branding as a regional transit hub. This vision is articulated in the Black Sea Submarine Cable project (BSCC), linking the region via a subsea cable to Romania.

In July 2024 the Italian consultancy CESI presented the initial conclusion of the Feasibility Study on the 1100 km BSCC cable designed to enable energy exports to Romania and, thereon, Central and Southeast Europe. The study funded by the World Bank determined the economic viability of the BSCC, while there is a parallel technical study (ESPIRE) – seabed survey to determine the optimal subsea route.³³ While the capacity of the cable does not exceed 1,3 GW capacity, or enough to electrify a city of slightly over a million people. However, the project is groundbreaking in that it opens a second market for the South Caucasus electricity market. The national grid companies of Georgia, Romania, Azerbaijan, and Hungary back the project.³⁴ The four states refer to the Agreement on Strategic Partnership in the Development and Transmission of Green Energy signed in 2022 “the Green Energy Corridor” and are in fact building a brand, apart from the green electricity production and transmission, that may in the future include the production and transit of Green Hydrogen. The BSCC has the stated support of the European Commission³⁵ and the four states support an application for the designation of the project as a “mutual interest” project (PMI), which given is the support of Romania and Hungary is likely to be granted. That is likely to accelerate the projects access to direct grants, soft financing, and accelerated permitting.³⁶

Starting from a low threshold of hydroelectric capacity exploration means that additional capacity adds to the attraction of Georgia both as a manufacturing investment destination and to the overall capacity to export cost-effective “dispatchable” electricity. This capacity is only theoretical unless a grid is available that can sustain and carry this electricity to market. From an investors' perspective, the Executive Director of the EU-Georgia Business Council Giorgi Kacharava, suggests that the national grid's capacity and resilience have been bolstered, with projects such as the Jvari-Khorga Interconnection. Both business representatives and the member of

33) “World Bank Approves 35\$ Million Investment for Black Sea Submarine Cable Project Preparatory Activities,” World Bank, 21 May 2024. See <https://www.worldbank.org/en/news/press-release/2024/05/21/world-bank-approves-35-million-investment-for-black-sea-submarine-cable-project-preparatory-activities>

34) Regional Growth: CESI Reveals Black Sea Cable Plan, CESI, 1 August 2024. See <https://www.cesi.it/news/2024/regional-growth-cesi-reveals-black-sea-cable-plan/>

35) “Statement by the President von der Leyen at the signing ceremony of the Memorandum of Understanding for the Development of the Black Sea Energy Submarine cable,” 17 December 2022. See https://ec.europa.eu/commission/presscorner/detail/en/statement_22_7807

36) Nazrin Abdul, “Advancing as green energy exporter: Black Sea Cable enhances regional energy security,” Azernews, 5 September 2024. See <https://www.azernews.az/analysis/230805.html#:~:text=The%20agreement%20outlines%20the%20construction,a%20capacity%20of%201%2C000%20megawatts>

the board of directors of Georgia's electricity grid (JSC Electrosystem), Dr Zviad Gachechiladze, point to political resolve reflected in the government's 10-year Network Development Plan of Georgia (2023-2033). For Georgia, the objective is to both attract investment in Georgia and to evolve and maintain its nation-branding as a regional transit hub. This vision is articulated in the Black Sea Submarine Cable project (BSCC), linking the region via a subsea cable to Romania.

Case Study 3: Azerbaijan's Intermittent Power

There is little doubt that should grid infrastructure and greenfield investment in proceed hand-in-hand, the South Caucasus can play an important role in sustainable electricity generation. The role of Azerbaijan in this respect is still not clear. According to the World Bank, Azerbaijan has wind generation capacity of around 157 GW, equivalent to more than 20 times its current installed electricity capacity.³⁷ This could allow Azerbaijan to evolve its position from a fossil fuels middle power to a renewables' powerhouse. In 2022 Baku unveiled a roadmap for the installation of 7GW offshore Wind Capacity by 2040, meeting 37 percent of its domestic energy needs.³⁸ Currently, Azerbaijan's renewables makeup approximately 20 percent of the country's energy mix, spearheaded by hydropower.³⁹ The pace of this projected development suggests a cautious approach to energy transition, as a range of regulatory and infrastructural bottlenecks have to be addressed.

The offshore wind sector passed the 1TW global installed capacity threshold in 2023 and is heading towards 2TW by 2030, lagging far behind hydroelectric production. The country's renewable capacity requires investment in infrastructure comparable to the push for the pipelines that placed the country on the fossil fuel map in the 1990s and early 2000s. Theoretically, investment in "upstream" production, the national grid and transborder interconnectors should enable the evolution of Azerbaijan's role in energy value chains. Dr Gachechiladze already points towards the possibility of the BSCC "congestion" pointing out that feasibility studies are underway for the scaling up subsea interconnectors to facilitate 4-to-6 GW to the EU. However, this transition does not have a precedent, economic, technical, or in terms of governance. At present, Baku sees in offshore Wind as a possible key to retaining a significant place on the future energy map. The objective is to triple the country energy capacity

37) GWEC, "Global Wind Report 2024"³. See https://gwec.net/wp-content/uploads/2024/04/GWR-2024_digital-version_final-1.pdf

38) "New Roadmap to help Unlock 7GW of Offshore Wind Potential in Azerbaijan by 2040," World Bank Group, 3 June 2022. See <https://www.worldbank.org/en/news/press-release/2022/06/03/new-roadmap-to-help-unlock-7gw-of-offshore-wind-potential-in-azerbaijan-by-2040>

39) "The Use of Renewables Energy Resources in Azerbaijan," The Ministry of Energy of the Republic of Azerbaijan, 6 March 2024. See <https://minenergy.gov.az/en/alternativ-ve-berpa-olunan-enerji/azerbaycanda-berpa-olunan-enerji-menbelerinden-istifade>

by 2030, in a race in which most countries need to race just to stand still. This will require creating a complete value chain, including the manufacturing capacity to produce wind components, advancing maritime spatial planning, and permitting regulation.⁴⁰

Case Study 4: Armenia's Path Towards Self-Reliance

Azerbaijan's stage-by-stage approach from the domestic substitution of fossil fuels to a renewable sector with export aspirations relies on some of the partners that paved its fossil fuel position in the energy market. BP is investing in solar power in Karabakh to electrify the operations of the Caspian Sea Sangachal oil terminal. Sangachal is Azerbaijan's largest onshore hub, where offshore oil and gas is processed prior to export.⁴¹ The investment also has symbolic significance, as "Project Sunrise" (Shafag) was the first major foreign direct investment in the territory following the war with Armenia in 2020.⁴² Nonetheless, Armenia and Azerbaijan have yet to sign peace and delimitation agreements, which coextensively means that Armenia cannot leave behind its networks' relative isolation. The country's grid is asynchronous to Georgia's and cross-border trade is limited. Aged interconnectors with Türkiye and Azerbaijan remain idle and unused.⁴³

While the national grid is gradually modernized with the support of the World Bank and Germany's KfW, the country's grid is bundled with electricity generation, operates under the single-buyer model, and is unable to attract foreign direct investment in renewables. The thrust of Armenia's self-reliance energy policy depends on thermal plants, whereas nuclear energy capacity is exported to Iran and bartered for natural gas supplies. Armenian nuclear energy is an entirely state-owned sector (ANPP) representing 37 percent of domestic installed generation capacity. The EU has encouraged the country to accelerate its investment in renewables, with some progress achieved in solar energy. However, major investment projects have failed to materialise and those implemented have more domestic rather than regional significance.⁴⁴

The most geopolitically significant development in Armenia's decarbonization

40) "Wind Europe and Azerbaijan join forces to accelerate wind energy," 4 March 2024. See

<https://windeurope.org/newsroom/press-releases/windeurope-and-azerbaijan-join-forces-to-accelerate-wind-energy/>

41) Vladimir Afanasiev, "BP signs green power deal in move to electrify Caspian oil and gas terminal," *Upstream*, 3 October 2024. See <https://www.upstreamonline.com/energy-transition/bp-signs-green-power-deal-in-move-to-electrify-caspian-oil-and-gas-terminal/2-1-1719007>

42) "Azerbaijan says it is discussing solar energy production in Karabakh with BP," *Reuters*, 21 May 2021.

See <https://www.reuters.com/world/middle-east/azerbaijan-bp-discussing-solar-energy-production-karabakh-azeri-president-2021-05-21/>

43) Armenia Country Profile: IEA. See <https://www.iea.org/reports/armenia-energy-profile/energy-security-2>

44) Hovhannes Nazaretyan, "Renewable Energy: Armenia's Opportunities and Limits," *EVN Report*, 20 April 2023. See <https://evnreport.com/raw-unfiltered/renewable-energy-armenias-opportunities-and-limits/>

agenda is negotiation with the United States to transition from reliance on Russia for nuclear fuel and technology.⁴⁵ There are also discussions on the adoption of small modular reactor (SMR) technology that should allow Armenia to maintain and perhaps expand the role of nuclear in its energy mix. This would be a move of major geopolitical significance, as the U.S. 1946 Atomic Energy Act sets limits to the export of nuclear technology abroad.⁴⁶ Furthermore, it would add to a policy of multi-alignment, stepping away from a singular dependence on Russia. Overall, Armenia will likely continue investing in nuclear energy as a path towards decarbonization, a pathway that echoes other landlocked countries, like Slovakia. However, beyond the geopolitical significance of the question at hand,⁴⁷ Armenia's does not seem to aspire towards a regionally significant role.

Concluding Remarks

First. Caucasus states negotiate their energy transition in a global governance framework, which puts manufacturing and energy value chains on a carbon tax notice. The “polluter pays” principle could erode Türkiye’s impressive expansion of its industrial base, in a crisis that would echo the current German industrial crisis. It could threaten the role of Azerbaijan as Europe’s energy partner, Georgia’s role as a transit hub. Armenia could lose a second opportunity for regional integration. To avoid these predicaments, national strategies seek to capitalise on available competitive advantages. Ankara is taking long-term calculated risks, to retain the competitively priced and dispatchable baseload energy that a manufacturing power requires. Likewise, Azerbaijan’s position on the energy map is challenged by liquidity limitations in the market for fossil fuel investment and the exhaustion of upstream potential. Looking forward, Baku needs to evolve its role. Starting from domestic fossil fuel substitution to maintain current levels of fossil-fuels exports, Azerbaijan tries to use its window of opportunity to evolve its current role as an exporter in the energy value chain. Georgia is trying to maintain its important transit hub role and enter more dynamically in production. Armenia is trying to evolve its self-reliance policy continues to prioritize security with a multi-alignment perspective.

Second. The building of new energy value chains requires risk and, therefore, well-planned de-risking strategies. Overall, the renewables energy market is more multidimensional, in that there is no single energy value chain that one can perfect

45) “Armenia seeks to join nuclear cooperation agreement with the United States,” Armen Press, August 22, 2024, <https://armenpress.am/en/article/1198120>

46) Armenia’s nuclear dilemma, Osservatorio balcani e caucaso, February 9, 2024, <https://www.balcanicaucaso.org/eng/Areas/Armenia/Armenia-s-nuclear-dilemma-233054>

47) Kacper Szulecki and Indra Overland, “Russian nuclear energy diplomacy and its implications for energy security in the context of the war in Ukraine,” Nature Energy, 27 February 2023. <https://www.nature.com/articles/s41560-023-01228-5>

over decades. Geothermal, hydro, wind, and solar need to work together, if the overall objective of net zero is to work at all. Entering many markets at the same time is more demanding in terms of national planning and calls engagement of a broader range of stakeholders. Türkiye is trying to overcome a prolonged currency crisis and rebuild confidence in its foreign investment environment, which is crucial to making the most out of local natural resources. Energy planning remains foundational to industrial policy, requiring for instance the capacity to manufacture key pumping components that will allow Türkiye to lead in geothermy while also reducing currency risks. Azerbaijan will likewise need to develop wind farming manufacturing components, probably relying on the evolution of its shipyards. Georgia will have to maintain foreign direct investment from Europe and Türkiye, balancing foreign policy priorities against a volatile political agenda. Finally, Armenia is trying to balance between energy as a security factor and as a factor of production. Creating a market that can be receptive to foreign direct investment may be the only way to mobilize the kind of capital the country requires to meet the decarbonization time-bomb.

Third. Politics can stand on the way of regional transition. Elections, conflict, currency fluctuation and sovereign debt crises can derail major projects. This volatility becomes less tolerable in a period that requires greenfield investment, wrapped in a period of political transition, and geopolitical multipolarity. The challenge at hand with renewables is the demand for long-term investment in projects that compete for returns-on-equity with seemingly more safe choice. That calls kind of risk requires higher yields. While the cost of failure maintains regulatory momentum on a national level, too many failures on a national level could trigger a crisis of confidence in the ability of global governance to produce the desired effect. The internationalization of carbon emissions costs by polluters only works if key stakeholders in the industry are convinced that there is no alternative. Capital markets, regulators, social stakeholders, and diplomats must focus minds, which is why the COP exercise remains invaluable. That is a test to the resilience of governance as such, not merely industrial policy. Global technology competition, say between Russian and American nuclear power, is not solely determined by value propositions, but in a broader balance of power.

List of Interviewees

Ardic Akcin, Independent Energy Investment Advisor.

Mathew Bryza, Senior Fellow, Atlantic Council's Global Energy Centre.

Zviad Gachechiladze, Board of Directors, JSC Georgian State Electrosystem.

Giorgi Kacharava, Executive Director, EU-Georgia Business Council (EUGBC).

Arvea Marieni, Belgian and Italian Climate Pact Ambassador.

Sanjeer Kumar, Head of Policy at European Geothermal Energy Council.

John Roberts, Senior Fellow, Atlantic Council Global Energy Centre.

Ufuk Senturk, Geothermal Power Plant Investors Association (JESDER).