



Digital as a Key Enabler for Climate Action:

The Caucasus and Central Asian
Perspective

Introduction

As addition to our global study “The Road to Sustainability: Digital Technologies as a Key Enabler for Climate Action,” this **regional chapter** further explores how digital technologies can be leveraged to meet the challenges across the three pillars of climate action (Mitigation, Adaptation & Resilience, Setting Foundations). Alongside six other regional deep dives, this chapter is intended to adapt global recommendations to the local context and distinct regional dynamics within **Caucasus and Central Asia**.

Caucasus and Central Asia are a diverse region with a wide range of countries, politics, infrastructure, and perspectives. Parallel to the regional outlook, Our analysis will draw from country-level figures and numerous case studies relevant to climate digital solutions. The case studies were selected based on their use of advanced digital technologies like AI and IoT to address climate change issues in the Caucasus and Central Asia. Each case study features a tangible product, demonstrating practical applications and proven results. We focused on examples from within the region that clearly connect the technology to climate action and present a 'win-win' scenario, benefiting both the environment and business interests. It is important to note that the inclusion of these case studies does not constitute an endorsement or recommendation by the report's authors, but rather serves as a description of relevant cases in the field, which should be evaluated in their specific contexts.



Climate Action in Caucasus and Central Asia – the current state

As the coming years will have the greatest influence on future climate stability, there is little time left to deploy and implement climate protection actions. One key component, though not sufficient on its own, is the reduction of greenhouse gases (GHG) (mitigation) to meet the Paris Agreement commitments **to limit overall global warming to 1.5 °C.**

The Caucasus and Central Asia region was responsible for **829 Mt CO₂eq in 2022 or 1.54% of the total global GHG emissions.**¹ However, the distribution of emitters within the region is very uneven, with Kazakhstan (332 Mt CO₂eq) polluting the most within the region, followed by Uzbekistan (227 Mt CO₂eq) and Turkmenistan (129 Mt CO₂eq) while Azerbaijan (69 Mt CO₂eq), Tajikistan (23 Mt CO₂eq), Kyrgyzstan (22 Mt CO₂eq) Georgia (18 Mt CO₂eq) and Armenia (9 Mt CO₂eq) have a more limited impact. Together, Kazakhstan and Uzbekistan account for two thirds of the emissions at the region level.

Countries in the region have made various commitments to climate targets under the Paris Agreement and their progress reflects the complexities of their economic structures and development statuses. While many countries in the region have taken steps to implement regulatory initiatives aimed at reducing greenhouse gas emissions, the challenges posed by their reliance on energy-intensive industries and fossil fuels mean that achieving these targets may prove difficult. Their climate strategies signal intent, but the path forward will depend on balancing environmental goals and strong policies with economic realities.

Specifically, Georgia has pledged to reduce its greenhouse gas emissions by 35% below 1990 levels by 2030.² This commitment is supported by the Integrated National Energy and Climate Plan (INECP), a comprehensive framework that outlines strategies to achieve these reductions while ensuring energy security and economic growth. Azerbaijan, similarly, has set a target to reduce its emissions by 35% by 2030 from its 1990 baseline but is being criticized for not having set a zero net target and for their level of policies and action.³ As a country heavily reliant on oil and gas, Azerbaijan is focusing on increasing the share of renewable energy in its energy mix and enhancing energy efficiency. Hosting the COP29 conference in Baku later this year, Azerbaijan is positioning itself as a leader in regional climate dialogue, providing a platform to foster collaboration and showcase its commitment to climate action on the global stage.

Kazakhstan, the largest emitter in Central Asia, has set its sights on achieving carbon neutrality by 2060, with an intermediate goal of reducing greenhouse gas emissions by 15% unconditionally—or up to 25% with international support—by 2030. To achieve these targets, Kazakhstan is expanding its renewable energy sector, particularly in wind and solar, and improving energy efficiency across various industries. The country has also implemented a national emissions trading scheme (ETS), the first in Central Asia,

designed to promote low-carbon development and attract investments in green technologies. Kazakhstan's approach is further supported by the Green Economy Concept, which lays out a roadmap for transitioning to a more sustainable economic model⁴, as well as an Emissions Trading System, launched in 2013.⁵

In addition to their climate targets, these countries have undertaken major regulatory initiatives and hosted significant events to bolster their climate efforts. For instance, Georgia is a member of the Energy Community, an international organization whose mission is to create an integrated pan-European energy market.⁶ Georgia has also passed a law on Energy Labeling, which mandates the labeling of energy-consuming products, encouraging more energy-efficient consumer choices and driving down energy use⁷, while the Law on Energy Efficiency of Buildings inspired by European Directive 2010/31/EU, sets minimum energy performance standards for new buildings or buildings undergoing major renovations.

Azerbaijan's climate policy approach is evolving, guided by the "National Adaptation Plan".⁸ This framework aims to improve resilience to climate change impacts, particularly in sectors like water management, agriculture, and coastal areas. Regulations on industrial emissions and waste management are examples of regulatory measures and incentives for renewable energy have been introduced by the Law on Renewable Energy which provides incentives like guaranteed tariff and secured offtake for investors.⁹

Together, these initiatives illustrate a strong regional commitment to addressing climate change, with each country taking steps to integrate sustainability into their development agendas. As these nations continue to implement their climate strategies, the balance between economic growth and environmental protection will be crucial to ensuring a just and sustainable transition to a low-carbon future.

The region demonstrates a notable level of awareness around sustainability issues, with a majority of the population expressing concern about the impacts of climate change. Surveys conducted across the region reveal that a significant proportion of the public perceives climate change as a serious threat, with many fearing its effects on vital resources such as water and food security.^{10,11} However, while there is widespread recognition of the issue, translating concern into tangible action has been limited, largely due to financial constraints. For instance, 63% of Kazakhstanis expressed reluctance to bear additional costs associated with environmental initiatives, such as switching to heat and energy saving or waste segregation, highlighting the challenge of balancing climate action with economic considerations.¹² At the same time, there remains a gap in public knowledge regarding their government's goals and policies when it comes to climate change, indicating a need for greater public engagement and awareness.¹³ The COP29 hosted in Azerbaijan, is expected to strengthen the region's commitment to addressing these challenges, offering a platform for governments to reinforce their climate strategies and align with global efforts for a sustainable future.



Case study

The "Yashil Makon" initiative in Uzbekistan is an afforestation program, supported by the international community, that leverages advanced technology to address the country's severe environmental challenges, particularly those linked to climate change.¹⁴ Launched in 2021, this ambitious project aims to plant 1 billion trees across Uzbekistan within five years, contributing to the fight against desertification, air pollution, and the degradation of vital ecosystems like the Aral Sea.

A key feature of "Yashil Makon" is its use of advanced digital technologies for environmental management. The initiative has implemented a comprehensive tree mapping and certification process, where over 250 million trees have been digitally cataloged. Each tree is assigned a unique identification number and digital passport through an electronic platform. This allows for precise monitoring and management, ensuring that the afforestation efforts are sustainable and targeted effectively. By integrating aerial imagery and data from satellite observations, the program can track the health and growth of these trees, making it easier to optimize the environmental impact and manage resources efficiently.

The climate impact of "Yashil Makon" is significant. By restoring vast tracts of land with drought-resistant plants like saxaul, the initiative helps to stabilize soil, reduce dust storms, and improve local microclimates. These efforts are crucial in a region where climate change is exacerbating extreme weather events, threatening water supplies, and diminishing agricultural productivity. The project also supports Uzbekistan's commitment to reducing the emission intensity of its economy by 35% per unit of GDP within the next decade, aligning with global climate goals.

The burning issues

Drawing on comprehensive discussions with a diverse range of stakeholders, three paramount issues have been pinpointed which, when addressed collectively, hold the key to propelling sustainable progress and equitability in the Caucasus and Central Asia region.



Water scarcity and management

Water scarcity is a critical issue across the region, driven by a combination of climate change, inefficient water management inherited from the Soviet Union, and rising demand from agriculture, industry, and urban areas. In Central Asia, the shrinking of the Aral Sea is a stark example of the region's water challenges. Georgia and Azerbaijan also face increasing pressure on their water resources due to changing precipitation patterns and growing consumption. Poor water management practices, outdated infrastructure, and transboundary water disputes further exacerbate the problem, threatening agriculture, drinking water supplies, and overall ecosystem health. Addressing water scarcity is essential for ensuring long-term sustainability and preventing conflicts over this vital resource.



Reliance on fossil fuels and energy transition

The region's economies are heavily reliant on fossil fuels, particularly oil and gas, which are major sources of revenue and employment in Azerbaijan and Kazakhstan. This dependence not only contributes to greenhouse gas emissions but also makes these countries vulnerable to fluctuations in global energy markets. Transitioning to a more sustainable energy mix, including renewable energy sources like wind, solar, and hydropower, is a significant challenge. Efforts to diversify energy sources are often hampered by existing infrastructure, investment patterns, and national and international interests that provide for the continued reliance on fossil fuels. However, without a shift towards cleaner energy, the region will struggle to meet global climate targets and reduce its carbon footprint.



Deforestation and land degradation

Deforestation and land degradation are pressing environmental issues, particularly in Georgia and Kazakhstan, where large areas of forest and grasslands are under threat from illegal logging, overgrazing, and unsustainable agricultural practices. In Georgia, forest ecosystems are vital for biodiversity, water regulation, and carbon sequestration, but they are increasingly threatened by human activities. In Kazakhstan, vast steppes and grasslands are being degraded due to intensive agriculture, intensive mining and industrial activities, leading to soil erosion, desertification, and loss of biodiversity. These land use changes not only contribute to climate change by releasing stored carbon but also reduce the resilience of ecosystems and local communities to climate impacts. Addressing deforestation and land degradation is crucial for maintaining ecological balance and ensuring the long-term sustainability of natural resources in the region.

Climate KPIs in Caucasus and Central Asia

Measure	Unit
Climate indicators – Changes in temperature by 2080-2099:	
Armenia ¹⁵	1.4 – 5.1 °C
Azerbaijan ¹⁶	1.2 – 4.7 °C
Georgia ¹⁷	1.4 – 4.9 °C
Kazakhstan ¹⁸	1.6 – 5.8 °C
Kyrgyzstan ¹⁹	1.4 – 5.6 °C
Tajikistan ²⁰	1.5 – 5.8 °C
Turkmenistan ²¹	1.3 – 5.1 °C
Uzbekistan ²²	1.3 – 5.3 °C
Activity indicators²³	
Absolute emissions per year (CO ₂ e)	ARM: 6M t / AZB: 37M t / GEO: 12M t / KAZ: 246M t / KYG: 10M t / TAJ: 11 M t / TUK: 70 M t / UZB: 132 M t
GHG per capita (CO ₂ e)	ARM: 3.2 t / AZB: 6.7 t / GEO: 4.7 t / KAZ: 17.3 t / KYG: 3.4 t / TAJ: 2.3 t / TUK: 20.8 t / UZB: 6.7 t

Across the Caucasus and Central Asia region, the percentage of renewable energy in the energy mix remains extremely low, reaching respectively 17% in Georgia²⁴ (mostly from hydropower), 7% in Azerbaijan²⁵, and only about 1.2% in Kazakhstan.²⁶ In Azerbaijan for example, natural gas continues to dominate domestic electricity production (93%), although the reduction of Russian energy imports by the EU provided serious incentives for the country to boost renewable sources of energy, as exemplified by the Masdar Project, a solar power plant initiative aimed at providing clean energy for 110,000 homes and reduce carbon emissions by 200,000 tons.²⁷ Georgia adopted a special Law on encouraging the production and use of energy from renewable sources through incentives, market access, and compliance with EU energy standards.²⁸ It sets national targets for renewable energy consumption, introduces a Guarantee of Origin system, and encourages decentralized energy production to enhance sustainability and energy security.

Digital Transformation and Innovation

In the Caucasus and Central Asia region, digital transformation is progressing but remains hindered by several key challenges. These include limited access to reliable internet, underdeveloped infrastructure, and economic disparities that prevent many rural areas from fully participating in the digital economy. While urban areas are witnessing advancements in digital infrastructure, rural regions remain underserved, slowing the overall digital transformation. The digital gap between urban and rural areas is notable, with less access to broadband, cloud computing, and advanced technologies such as 5G in remote parts of the region. In Georgia for instance, one in six people does not have access to internet in rural areas.²⁹

Despite these obstacles, governments and private sectors in the Caucasus and Central Asian region have begun to invest in digital initiatives. For example, Armenia is the first country in the region to approve a “Cloud-first policy”, implying cloud will become the main preservation tool for public authority information systems instead of traditional servers.³⁰ Azerbaijan is increasingly focused on becoming a knowledge-based economy³¹, while Georgia’s National Digital Transformation Strategy is pushing for greater integration of technologies such as artificial intelligence (AI), cloud computing, and big data. The private sector is also adopting cloud-based solutions and AI tools, although broader adoption remains limited by infrastructure gaps and skill shortages.

Digital technologies present significant opportunities for climate resilience in the region, particularly given its vulnerability to climate change impacts such as desertification, melting glaciers, and biodiversity loss. Harnessing digital solutions to drive sustainability requires the right policies as well as investments in infrastructure and technology. To maximize the potential of digital transformation in the region, three key priorities have emerged:

- **Expand broadband and digital infrastructure:** A key challenge to advancing sustainability through digital transformation is the unequal access to internet services, particularly in rural and remote areas. Expanding broadband infrastructure in these regions is crucial to ensuring that digital solutions, such as cloud computing, AI-powered tools, and remote work opportunities, are available to all. This connectivity will not only drive economic development but also enhance climate resilience by enabling better access to information and technologies that support sustainable practices, resource management, and climate adaptation strategies.
- **Promote digital skills development and education:** Developing a digitally proficient workforce is essential for fostering innovation and deploying technologies that support sustainability and climate action. The Caucasus and Central Asia region is heavily reliant on oil and gas, which account for a significant portion of its economy, with Kazakhstan alone deriving approximately 20% of its GDP and over half of its export revenue from oil and gas.³² This underscores the importance of investing in education and skill-building programs that focus on renewable energy, AI, data analytics, and the Internet of Things (IoT). By equipping the workforce with these skills, the region can support a just transition away from fossil fuels, reducing its reliance on carbon-intensive industries while fostering new, sustainable economic opportunities. Additionally, these initiatives will help bridge the economic divide between urban and rural areas by creating new opportunities in the growing tech sector, which is increasingly linked to sustainable development.
- **Utilize AI and satellite imaging for environmental monitoring:** In the Caucasus and Central Asia, with its diverse landscapes and ecosystems, AI and satellite imaging provide powerful tools for tracking environmental changes. These technologies can be used to monitor deforestation, assess the health of natural ecosystems, and observe changes in land use or agricultural patterns. In Azerbaijan, satellite imaging can help monitor coastal regions and assess the environmental impacts of industrial activities. In Kazakhstan, where vast steppe regions are prone to desertification, these tools can provide early warnings and guide sustainable land management practices. Georgia, with its rich biodiversity, can use AI-driven monitoring systems to protect its forests and water resources.



Case study

Azercosmos, Azerbaijan's national space agency, is playing a crucial role in advancing climate monitoring and environmental protection through its cutting-edge satellite technologies. One of the key initiatives is their "Climate Change - an Eye from Space" platform, which leverages satellite imagery to monitor and analyze the impacts of climate change across Azerbaijan. This platform provides detailed insights into critical areas such as snow cover, glacier retreat, water resource levels, drought and desertification risks, and atmospheric changes. By using high-resolution satellite data, Azercosmos enables precise tracking of environmental changes, which is vital for informed decision-making and effective climate action in the region.

Additionally, Azercosmos is expanding its capabilities through the upcoming Azersky-2 program. This program involves the deployment of two advanced multispectral electro-optical satellites, which will significantly enhance Azerbaijan's ability to monitor environmental changes and manage natural resources. The satellites will offer high-resolution imaging that is crucial for detecting subtle but impactful shifts in the environment, such as soil salinity and changes in vegetation cover.

These technological advancements not only support Azerbaijan's climate goals but also position the country as a regional leader in space-based environmental monitoring. By integrating these satellite technologies with data-driven platforms, Azercosmos is providing valuable tools for mitigating the effects of climate change, protecting ecosystems, and enhancing the sustainability of natural resources.

Climate Forward Government

Governments may effectively handle risks and challenges in environmental action by setting goals and creating a flexible framework to achieve them. As a first step, comprehending regional barriers and complexities is key so that policymakers can tailor their strategies to effectively address them, enabling the acceleration of digital tech-driven climate action.

Barriers to Digital Climate Solutions

Globally, two main overarching barriers to harnessing the potential of digital technologies for climate action have been identified: insufficient innovation and insufficient engagement. The Caucasus and Central Asia region presents 3 main challenges that need to be overcome:

1. Digital infrastructure gaps

While digital infrastructure has been developing in the region, significant disparities remain, particularly between urban centers and rural or remote areas. In many of these regions, there is limited access to high-speed internet, reliable electricity, and modern telecommunications networks. This uneven distribution of digital infrastructure hinders the deployment and use of advanced technologies for climate monitoring, data analysis, and early warning systems. As a result, communities in these underserved areas are less able to benefit from digital solutions that could help mitigate and adapt to climate change impacts.

2. Limited funding and oil & gas reliance

Lack of funding continues to hinder the development of digital technologies for climate action in the region. Financial constraints, compounded by the heavy reliance on oil and gas industries, divert resources away from climate-friendly digital innovations. This dependency limits investment in research, cutting-edge technologies, and scalable digital platforms that could support climate adaptation and mitigation. Even when international funding is available, bureaucratic hurdles often delay access, leaving promising technologies underdeveloped and inaccessible where they are needed most.

3. Regulatory and policy constraints

The regulatory and policy environments in the region are evolving but may not yet be fully conducive to the integration of digital technologies into climate action frameworks. Issues such as inadequate data governance laws, unclear regulations around digital innovation, and bureaucratic hurdles can slow down the adoption of new technologies. Moreover, the pace of policy reform often lags behind technological advancements, leading to regulatory uncertainty that can deter investment and innovation in digital climate solutions. Additionally, there may be resistance to change within established institutions, which can further delay the implementation of necessary reforms. Without clear, supportive policies that encourage the use of digital tools for climate action, it becomes challenging to scale up these technologies to address the pressing environmental issues facing the region.



Case study

In the aftermath of the Shovi landslide in Georgia, which occurred on August 3, 2023 and claimed the lives of 33 people³³, there has been substantial discussion around the need for an early warning system. Experts and the public have criticized the government's response, highlighting that such a system could have helped prevent some of the loss of life. It was noted that while landslides and natural disasters of this scale are difficult to predict, an early warning system might have provided a critical window of time for evacuation. Some experts stated that a warning issued even a few minutes before the landslide could have made a difference in saving lives.

In response, the Georgian government has reiterated its commitment to developing such systems. The government had previously planned to implement an early warning SMS system to notify residents and visitors in vulnerable areas of imminent natural disasters. This commitment had been part of the broader effort to establish up to 150 automatic monitoring stations across the country³⁴, though progress had been slow before the Shovi disaster.

These efforts are ongoing, but the Shovi landslide has accelerated the urgency to improve Georgia's disaster preparedness and response systems. However, experts believe that full implementation of modern monitoring and early warning systems will take several more years.

Policy Goals

To address the aforementioned challenges, policy goals in Caucasus and Central Asia could benefit from the implementation of two core strategies:

First, policymakers could consider promoting innovation and investment in digital climate solutions. Promoting and creating a thriving ecosystem for digital innovation in climate action is vital. This involves not only providing financial incentives such as grants, tax benefits, and subsidies to startups but also fostering collaboration between governments, private sectors, and academic institutions. Such efforts will encourage the development and implementation of cutting-edge technologies that can address both local and regional climate challenges.

Second, policymakers might explore options to accelerate digital transformation by strengthening the regulatory framework. Establishing adaptive and flexible regulatory frameworks is necessary to promote the integration of emerging digital technologies into climate action initiatives. These frameworks should be designed to encourage experimentation, lower barriers to entry for innovators, and streamline the adoption of solutions that address both immediate and long-term climate risks. By doing so, governments can ensure that digital tools play a central role in national and regional climate strategies.



Case study

Sweeft Digital's AgriTech Solutions is a Georgian tech company that has developed several digital solutions in the AgriTech sector, aimed at improving agricultural efficiency and sustainability. They utilize IoT (Internet of Things) devices and data analytics to optimize water usage, monitor soil health, and predict crop yields. This helps reduce waste, conserve resources, and increase the resilience of agriculture to climate variability. By helping farmers make data-driven decisions, Sweeft Digital's solutions can contribute to more sustainable agricultural practices, reducing the environmental footprint of farming in Georgia.



Case study

The Climate Change Technology Accelerator (CCTA), is an Armenian-based program co-initiated with the UNDP and targeting challenges in climate change.³⁵ This accelerator supports Armenian and international startups working on innovative climate tech solutions spread across three different categories: agriculture and forestry, sustainable urban development, and energy efficiency and renewable energy. By providing mentorship, technical guidance, and funding opportunities to these startups, the program aims to scale them up and make them investment ready.

Digital Tech Policy

In presenting the potential policy measures for achieving these goals, the Digital Sprinters Framework by Google offers a structured approach. This framework defines four primary categories: Infrastructure, People, Market Environment and Tech Innovation. Each category addresses specific policy aspects that can facilitate sustainable and inclusive economic growth while harnessing the power of digital transformation.



Infrastructure

- **Invest in renewable energy grid modernization:** Governments could prioritize upgrading energy grids to accommodate renewable energy sources like solar, wind, and hydropower. This would allow for more efficient distribution of clean energy and reduce reliance on fossil fuels.
- **Implement smart water management systems:** Use digital technologies like IoT sensors and data analytics to optimize water usage in agriculture and urban areas. Additionally, governments from neighboring countries could consider investing in common infrastructure or collaborate to ensure the protection and rational use of shared water resources.
- **Expand digital monitoring systems for emissions:** Build out networks of sensors and satellite systems to track and report greenhouse gas emissions across industries and regions, providing governments with real-time data to manage their climate goals more effectively.



People

- **Increase environmental and digital literacy:** Implement educational programs that focus on digital and environmental skills, encouraging young people to pursue careers in green technology sectors. This can lead to a workforce better equipped to tackle climate change through technological innovation.
- **Promote climate mitigation and adaptation training:** Offer specialized training programs for government officials, industry leaders, and communities on climate resilience, mitigation and adaptation strategies, and the use of digital tools for climate action.
- **Support reskilling for green jobs:** Create programs that help workers in carbon-intensive industries transition to roles in renewable energy, energy efficiency, and digital climate solutions, reducing unemployment while driving down emissions.



Market Environment

- **Streamline environmental regulations:** Simplify and harmonize regulations around climate technologies, ensuring that businesses and investors can navigate climate-related markets efficiently without bureaucratic delays.
- **Create green technology incentives for businesses:** Governments should consider providing tax credits or grants to companies investing in digital solutions that reduce emissions, such as energy-efficient technologies or digital tools for resource management.
- **Develop carbon pricing mechanisms:** Establish carbon trading schemes or carbon taxes to incentivize businesses to lower their carbon footprints. Using digital tools to monitor and verify emissions can enhance the efficiency and transparency of these markets.
- **Encourage public-private partnerships for climate projects:** Facilitate collaboration between governments, businesses, and academia to develop large-scale climate adaptation projects, such as smart cities or renewable energy initiatives, which leverage digital technologies.
- **Support green financing initiatives:** Promote the development of green bonds and other financial products that encourage investment in climate-related digital innovations, making it easier for businesses and startups to access capital for green projects.



Tech Innovation

- **Adopt AI for climate modeling, climate mitigation strategies and disaster prediction:** Invest in artificial intelligence (AI) and machine learning technologies that can analyze vast datasets to improve climate modeling, predict extreme weather events, and develop targeted climate mitigation and adaptation strategies.
- **Foster innovation in climate tech startups:** Provide grants, incubators, and innovation hubs like GITA (Georgia's Innovation & Technology Agency) or the Astana Hub that support startups focusing on digital climate solutions such as carbon capture technologies, AI-driven climate analytics, and renewable energy optimization
- **Deploy blockchain for emissions tracking:** Use blockchain technologies to create transparent and tamper-proof systems for tracking emissions and carbon credits, ensuring that climate data is accurate and easily verifiable.



Case study

Ozen-M is a startup founded in Kazakhstan which developed a web-based application designed for efficient water resource management. Featuring an interactive map, Ozen-M enables users to monitor river and tributary flows and pinpoint the locations of key hydraulic structures within a river basin for effective management water resources. In 2024, Ozen-M secured second place among 22 teams from worldwide at the Vienna Green Projects Competition.³⁶

Industry Perspectives

Having identified what can be done, and how to do it, the next question is where to start. Based on current emission levels and the expertise of interview partners, special attention is recommended on implementing digital technologies leveraging climate action should be placed on the following four key industries: **Energy, Industry, Transportation, and Agriculture.**

Industry	Recommendation ³⁷	Suggested specific action	Priority
Energy	Smart grid and energy storage	Provide financial incentives, such as tax breaks or grants, to energy companies that adopt smart grid technologies. These systems improve energy efficiency by balancing supply and demand, integrating renewable energy and reducing transmission losses	High
	Generation of renewable energy/minerals	Invest in AI/driven renewable energy forecasting tools to help energy producers optimize the use of wind and solar power. Government can fund research and development or offer subsidies to companies deploying these predictive technologies ensuring more stable and reliable renewable energy production	Medium
		Establish green hydrogen export strategies that would enable governments to position their countries as key exporters of green hydrogen in external markets	Medium
Industry	Subsidization of digital tools	Establish digital innovation funds or grants specifically aimed at encouraging manufacturing firms to adopt automation, IoT, and predictive maintenance technologies. These tools can enhance energy efficiency and reduce emissions by optimizing extractive techniques and/or minimizing equipment downtime and improving overall production processes	Medium
Transportation	Transition to EV	Create public-private partnerships to expand electric vehicle (EV) charging infrastructure, particularly in urban areas	Medium
Agriculture	Sustainable farming techniques	Allocate funds to support farmers in adopting precision agriculture tools like drones, sensors, and AI platforms. These technologies can help optimize water use, fertilizer application, and crop management, improving agriculture efficiency and reducing emissions from farming practices	High

Conclusion

This regional chapter highlights the critical role that digital technologies can play in enabling climate action in the Caucasus and Central Asia. As these countries strive to balance economic growth with their commitments to reduce greenhouse gas emissions and adapt to climate change, digital transformation offers a unique opportunity to accelerate their efforts. However, the region faces significant barriers that need to be addressed, including digital infrastructure gaps, limited funding, and regulatory and policy constraints. These challenges call for coordinated efforts from governments, industry, and international partners to create the conditions necessary for effective climate action.

Water scarcity, dependence on fossil fuels, and land degradation are pressing issues in the Caucasus and Central Asia. These challenges, exacerbated by climate change, threaten both the environment and economic stability. Addressing these concerns is crucial for the region to ensure a sustainable future while navigating the complexities of resource management and environmental protection.

Despite increasing awareness of sustainability, the region faces gaps in digital infrastructure, particularly between urban and rural areas. This digital divide limits the ability to deploy essential climate technologies, though recent efforts to integrate digital solutions signal an emerging shift towards a more sustainable and digitally-driven climate strategy.

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