

Industries in Transitions: Decarbonising Hard-to-Abate Sectors

Energy Week Central Asia & Caspian 2024



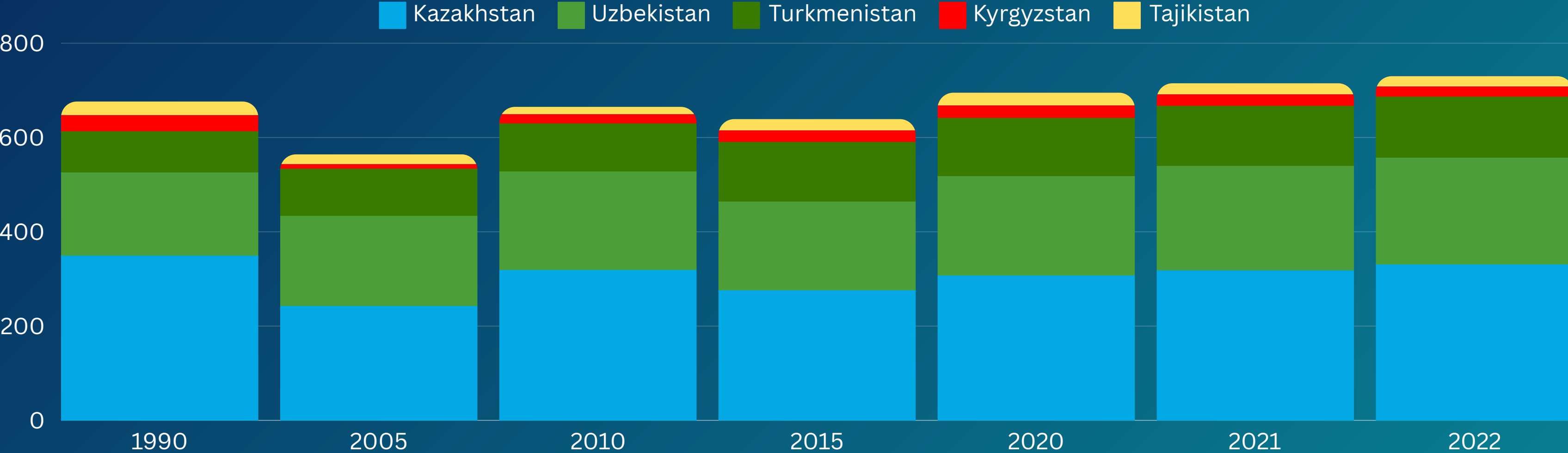
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Founder of Global ESG Partnership



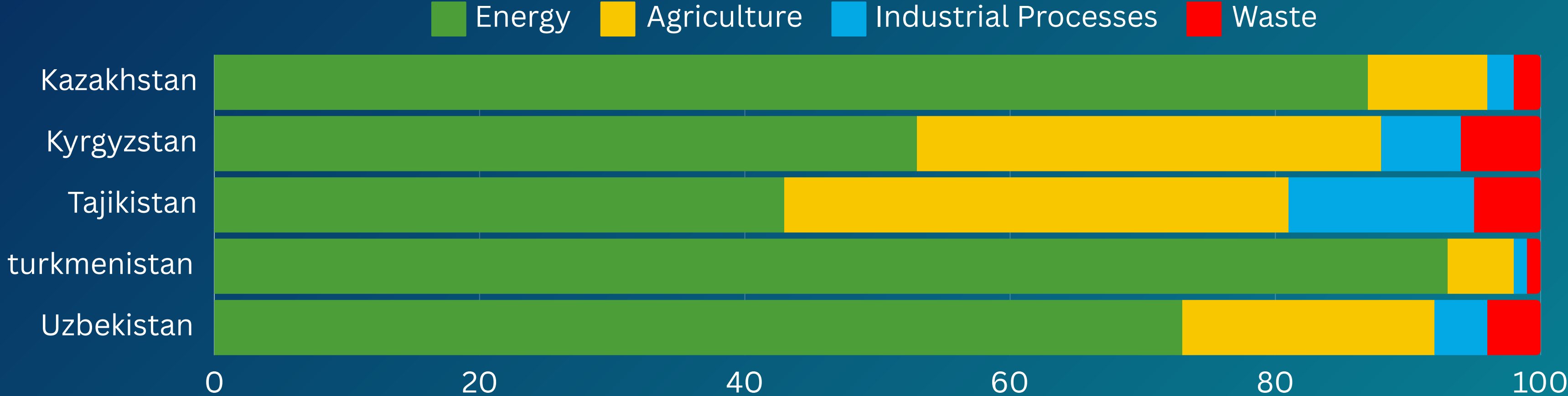
GHG Emissions of Central Asian Countries

According to the Emissions Database for Global Atmospheric Research (EDGAR), in 2022, the combined share of greenhouse gas emissions from Central Asian countries accounted for 1.36% of global GHG emissions. From 1990 to 2022, the total emissions of Central Asian countries increased from 669.4 million tons of CO2 equivalent to 732.4 million tons of CO2 equivalent. Compared to 1990, a slight reduction was observed in Kazakhstan and Kyrgyzstan, while in Tajikistan, the level remained roughly the same. However, in Turkmenistan and Uzbekistan, GHG emissions significantly increased during the specified period.



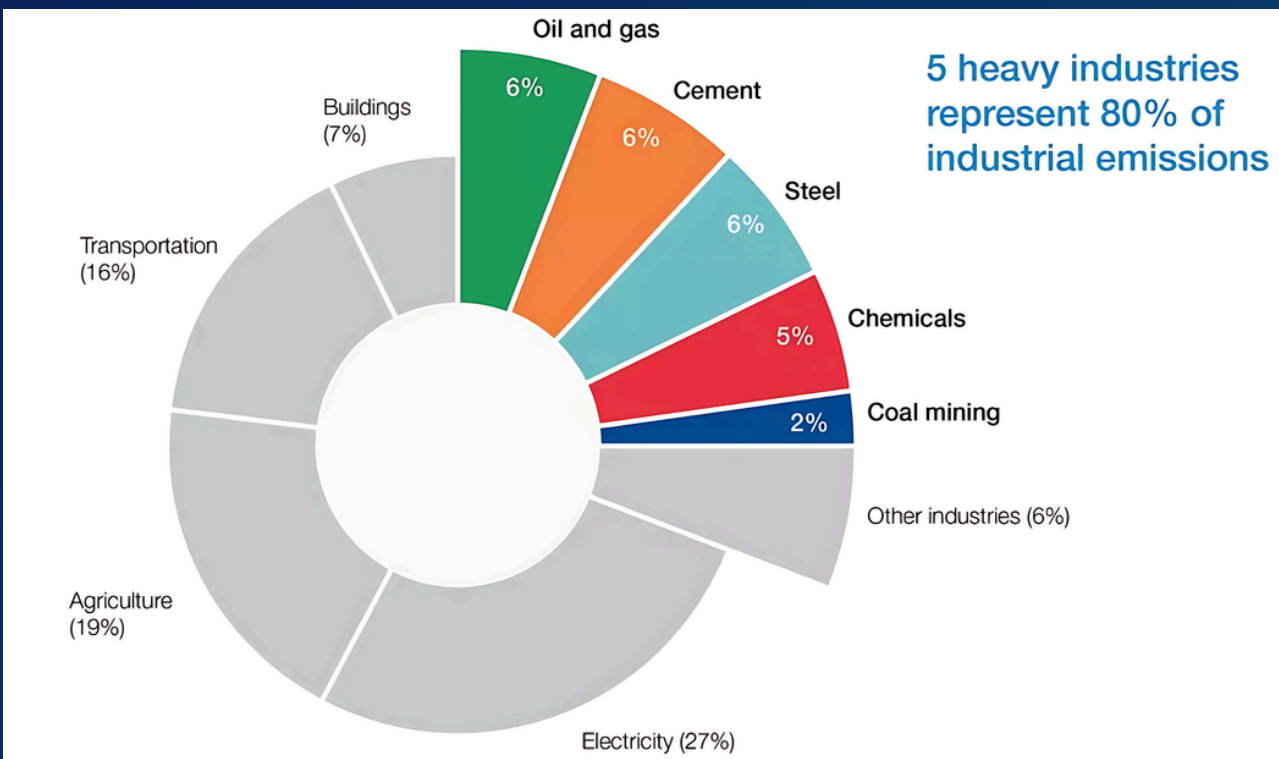
GHG Emissions of Central Asian Countries by Sectors

All countries in the region exceed the global average GHG emissions per unit of GDP (0.38 tons of CO₂-equivalent per \$1,000/year), indicating high carbon intensity of their economies. Turkmenistan (1.3 tons of CO₂-equivalent per \$1,000/year) and Kazakhstan (0.64 tons of CO₂-equivalent per \$1,000/year) lead in emissions. Fossil fuels account for 95% of the region's energy supply, while renewable energy sources (RES) account for less than 5%. The energy sector is the main source of GHG emissions in Central Asia.

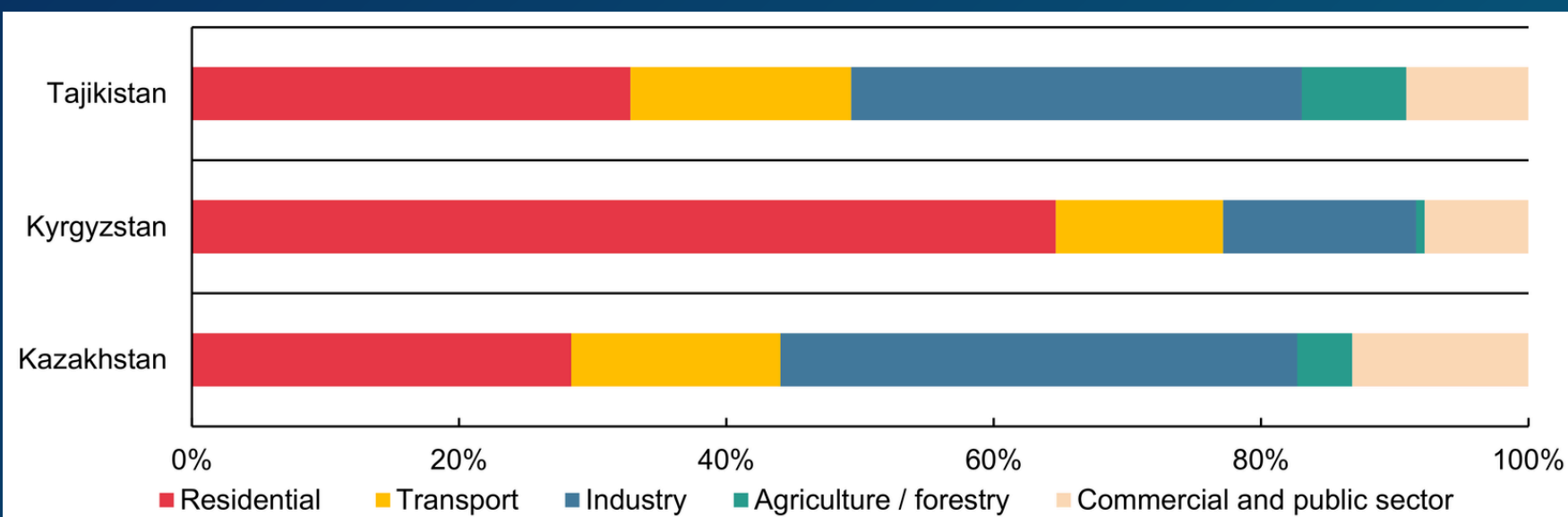


Hard-to-Abate Sectors: Central Asia & Caspian Focus

Emissions by sector vs global emissions



Central Asian total energy consumption by sectors



Key Sectors in Central Asia and Caspian:

Mining and Metallurgy

Kazakhstan is a global player in the production of aluminum, copper, and uranium. The steel industry, heavily reliant on coal, contributes to substantial CO2 emissions.

Cement

Growing construction demand in Kazakhstan and Uzbekistan is driving cement production, a sector known for high CO2 emissions due to its energy-intensive processes.

Petrochemicals and Refining

Azerbaijan, Turkmenistan, and Kazakhstan are significant producers of oil and gas, with downstream petrochemical industries that are carbon-intensive.

Transport

The region's overland freight systems and aviation are key components of its connectivity, heavily dependent on fossil fuels.

Decarbonization Challenges



Heavy Reliance on Fossil Fuels:

- Fossil fuels account for 95% of the energy mix in Central Asia, making the region one of the most carbon-intensive globally.
- Coal remains the dominant energy source in the region, particularly for industrial processes like steel production and cement manufacturing. This makes transitioning to cleaner energy sources particularly challenging.



Aging Infrastructure and Technological Gaps:

- Much of the industrial infrastructure in Central Asia is aging and was designed to operate on fossil fuels. Retrofitting existing facilities to accommodate renewable energy sources or more energy-efficient technologies is costly and complex.
- The region also lacks the technological advancements and infrastructure needed to implement modern decarbonization technologies like carbon capture and storage (CCS) and green hydrogen.



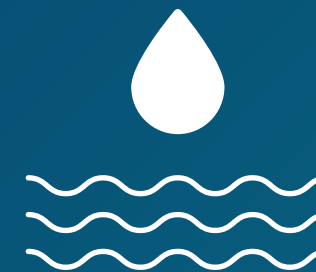
Economic Dependence on High-Emission Industries:

- Central Asian economies are heavily dependent on industries that are difficult to decarbonize, such as mining, metallurgy, and petrochemicals. For instance, Azerbaijan, Turkmenistan, and Kazakhstan rely on oil and gas exports, which complicates their efforts to reduce emissions while maintaining economic growth.



Financial Constraints:

- The transition to a low-carbon economy in Central Asia requires massive financial investments. For example, Kazakhstan alone needs an estimated \$610 billion to achieve carbon neutrality by 2060. Securing this level of funding is a significant challenge, especially in the context of global competition for green investments.



Climate Vulnerability and Limited Water Resources:

- Climate change is already affecting Central Asia, with shrinking glaciers and decreasing surface water flow posing threats to agriculture and water security. These environmental stresses compound the challenge of decarbonization, as water is also critical for many industrial processes.



Policy and Regulatory Gaps:

- Regulatory frameworks in Central Asia are still evolving to support decarbonization. While some countries, such as Kazakhstan, have developed national strategies for green growth, the implementation of these strategies is often slow, and enforcement remains weak.

Decarbonization Strategies for Central Asia's Hard-to-Abate Sectors

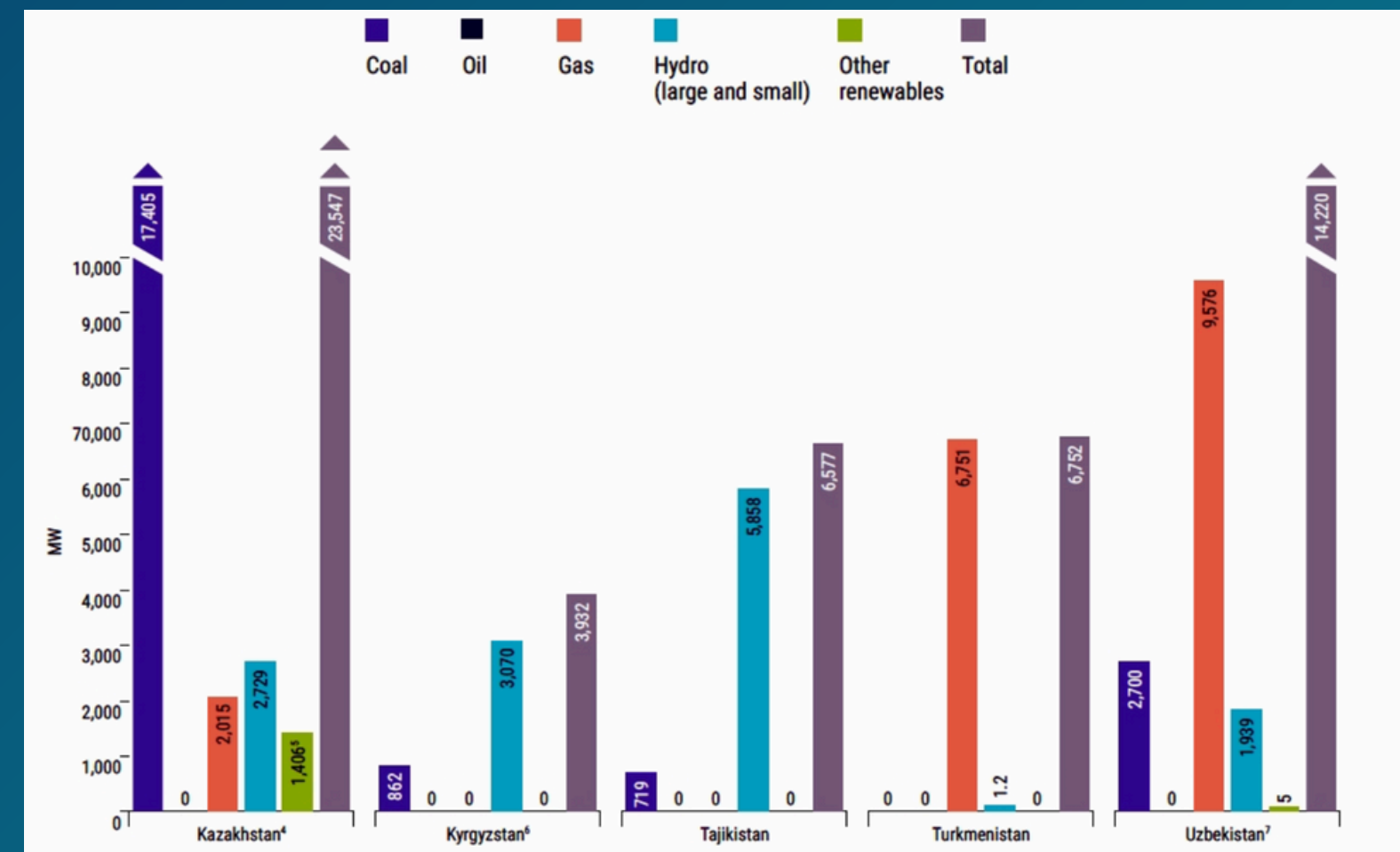
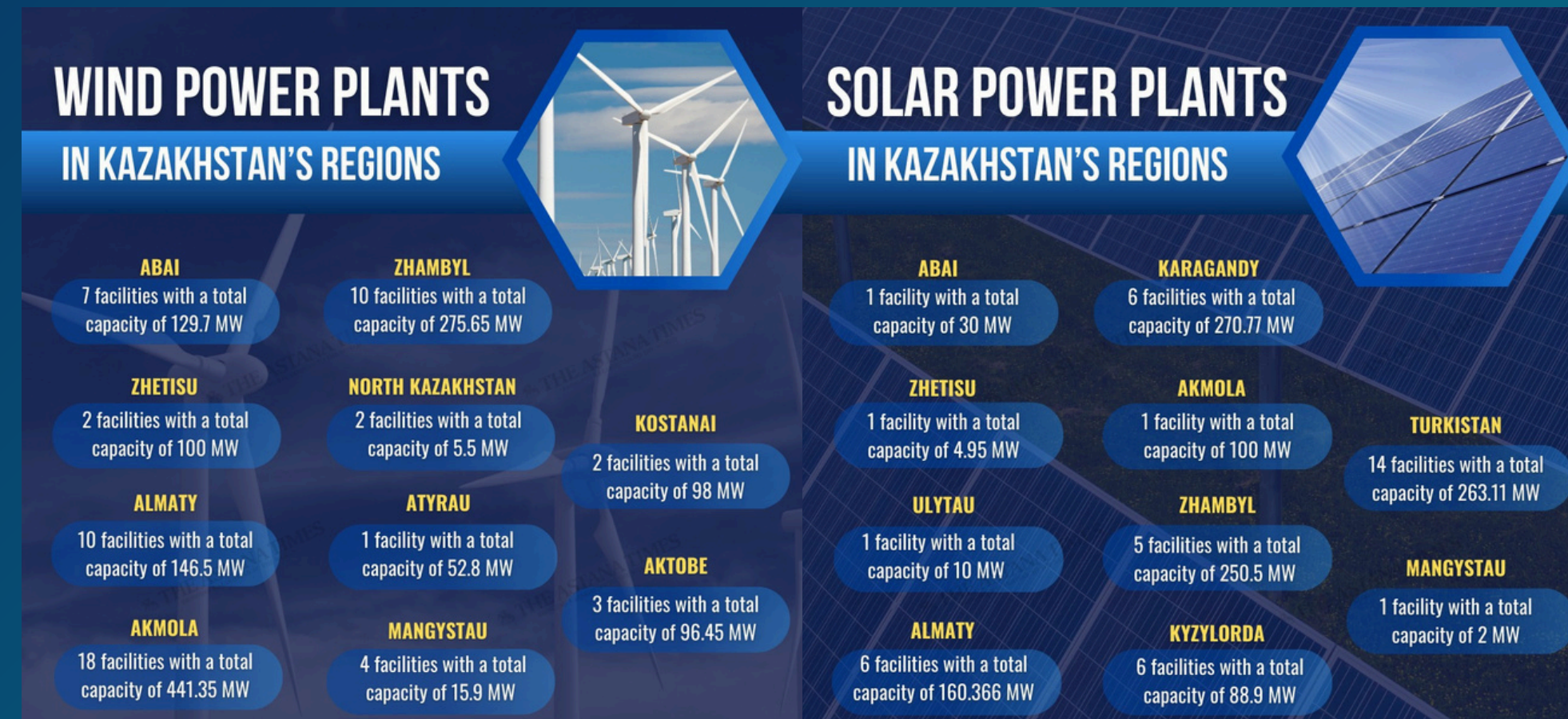
Electrification of Industrial Processes:

Central Asia has significant untapped potential in renewable energy, particularly in solar and wind. According to the World Bank, Kazakhstan has a technical potential of 3,760 GW in solar energy and 354 GW in wind energy. Uzbekistan also has similar potential, particularly in solar energy, which could be harnessed to decarbonize industrial processes like mining and metallurgy.

Challenges

Grid infrastructure in the region is outdated and underdeveloped, making it difficult to integrate large-scale renewable energy projects. For instance, only around 5% of the installed capacity in the region comes from renewable sources. Investment in grid modernization is essential to ensure stable integration of renewables.

Kazakhstan is making significant strides in renewable energy, with 146 operational facilities contributing a total of 2.9 gigawatts (GW) of clean energy.



installed power generation capacity by country and energy source (in MW) for the Central Asian countries

Workplace Safety, Digitalization, and New Employment Models

Workplace safety must remain a top priority as hard-to-abate sectors undergo decarbonization. The introduction of new technologies and processes should not compromise worker safety. It's essential to implement advanced safety standards that align with digital transformation and the automation of industries.



According to the International Labour Organization (ILO), more than 2.78 million work-related deaths occur each year, and sectors like mining and heavy industry account for a significant portion of these incidents. Improving safety through technology can play a key role in reducing these numbers.

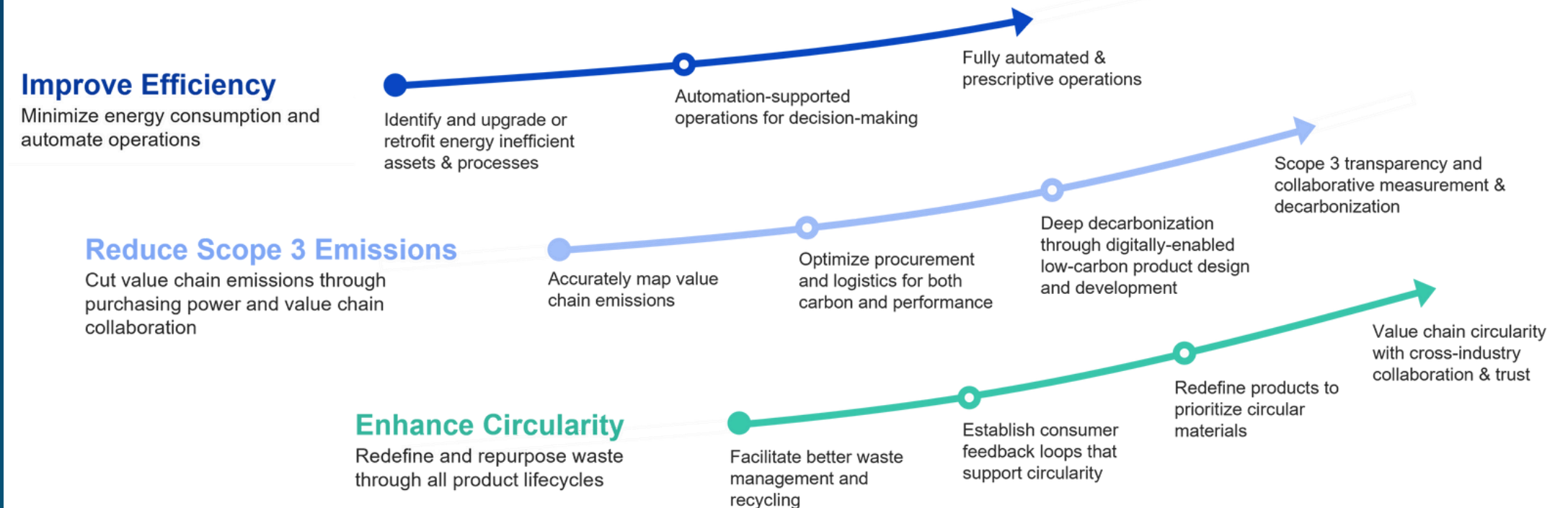


Workplace Safety, Digitalization, and New Employment Models

Digitalization and Robotics:

Digitalization and robotics can significantly enhance productivity and safety in sectors like mining and metallurgy. Technologies such as Artificial Intelligence (AI) and the Internet of Things (IoT) can automate dangerous tasks and reduce the risk of accidents.

Digital can support the road to Net Zero for hard-to-abate sectors across materials, energy, buildings, and mobility.



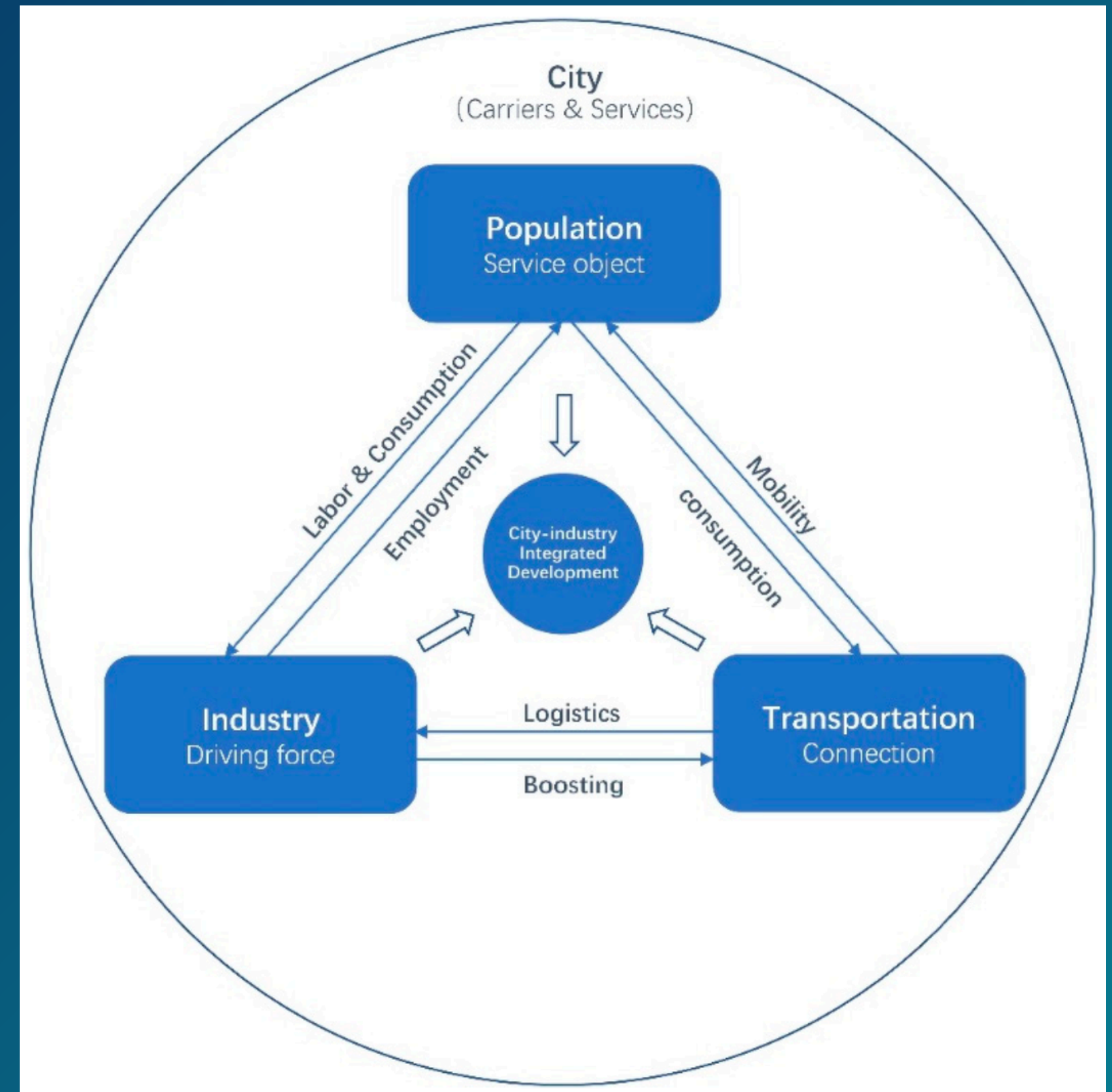
Source: Accenture in collaboration with the World Economic Forum

Workplace Safety, Digitalization, and New Employment Models

City-Forming Industries and New Employment Models:

Many of the industries in hard-to-abate sectors, such as mining and metallurgy, are the backbone of cities in Central Asia. These industries provide significant employment, but the transition to low-carbon technologies and automation may result in job displacement.

Governments and companies must work together to develop new employment models that emphasize retraining and upskilling workers. For instance, the World Economic Forum suggests that the transition to a green economy could create 24 million new jobs globally by 2030, but this will require a focus on education and skills development in sectors such as renewable energy and digital technologies



Decarbonization Strategies for Central Asia's Hard-to-Abate Sectors



Green Hydrogen for High-Temperature Processes

Green hydrogen is emerging as a promising solution for decarbonizing hard-to-abate sectors globally. It can be used to replace coal in steelmaking and as a fuel source for cement production, where traditional electrification methods are not viable. According to IRENA, green hydrogen could play a crucial role in decarbonizing the global economy, and Central Asia, with its renewable energy potential, could be a major player in this new market



Carbon Capture, Utilization, and Storage (CCUS)

CCUS is a key technology for reducing emissions in industries where direct electrification or fuel switching is not feasible, such as cement, steel, and petrochemicals.

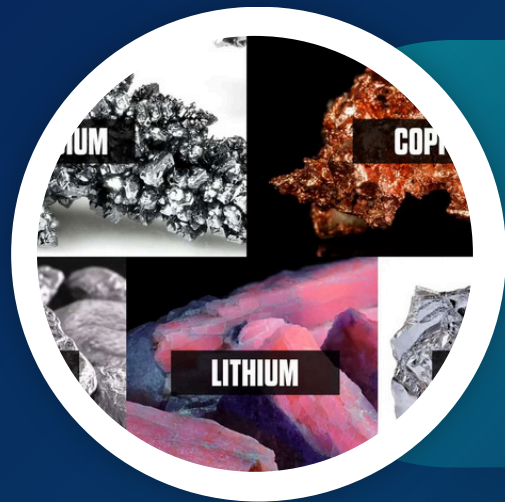
Globally, CCUS is expected to mitigate 15% of the cumulative CO2 emissions required to reach net-zero targets by 2050, making it a crucial component of industrial decarbonization



Improving Energy Efficiency

Energy efficiency improvements are vital for reducing emissions across sectors. In Uzbekistan, broader national efforts to improve energy efficiency, including industrial modernization initiatives, are ongoing and could contribute significantly to emissions reductions

Opportunities for Central Asia



Growth in Green Metals

Demand for green metals like aluminum, copper, and nickel is set to rise as the world transitions to renewable energy and electric vehicles. Central Asia, with its rich resources, is poised to benefit from this demand.



Green Finance

Access to green bonds and climate finance can fund the region's decarbonization efforts, attracting international investments. The combined sustainable finance market in Central Asia has now exceeded \$2 billion, showing significant growth as countries in the region prioritize green investments



Regional Cooperation:

Collaboration between governments, industries, and international partners is crucial for accelerating the transition to a low-carbon economy.

Welcome to Global ESG Partnership

A non-profit organization committed to fostering sustainable business practices

30+ **10+** **100+**

Experts

Countries
Worldwide
on the
Client Map

Consulting
Projects




Our History

Established in 2023 to promote sustainable development and ESG practices globally, rapidly expanding through strategic partnerships and a network of diverse experts.

Current Projects

We're actively involved in projects targeting decarbonization in key sectors such as mining, energy, and manufacturing. Notable initiatives include the development of renewable energy projects, energy-saving systems, and carbon-neutral strategies across Central Asia

Thank You For Your Attention

 More Information
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