

Green Economy and Energy Efficiency Challenges Facing Azerbaijan

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The ambitious decarbonization goals of Cop29 host Azerbaijan, with its relatively small and oil-dependent economy, the recent launch of a number of large-scale renewable energy projects, and the highest growth rates of solar and wind energy production in the country's history in the first months of 2024, are drawing the attention of experts. Are we witnessing a unique experiment—a rapid transition of a country whose economy is heavily dependent on oil and gas to renewable energy? Most of the existing practices and theories hold that oil-and-gas-rich countries will not easily switch to renewable energy because they are primarily dependent on oil rents. Considering the interest in profit, how economically viable are Azerbaijan's planned and ongoing major investment projects in renewable energy and the government's decarbonization targets (reducing greenhouse gas emissions by 35% by 2030)? To answer this question, we must first look at the current state of energy efficiency in the country.

What is energy efficiency and why is it important?

Energy efficiency [means](#) using less energy to perform the same task. In other words, when we speak of energy efficiency, we mean reducing GDP energy intensity at the macro level, while achieving high benefit-cost ratios by reducing producer's losses in energy production at the micro level. It turns out that energy efficiency firstly results in a reduction of greenhouse gas emissions, thereby reducing costs and ultimately increasing the competitiveness of the country's economy. Energy efficiency is improved by making progress in the efficiency of each of the sectors and factors that play a

leading role in energy consumption (energy production and transmission, industry, buildings, transportation and consumer behavior).

Energy efficiency is indeed of particular importance in energy-producing economies like Azerbaijan, which are mainly dependent on conventional sources of energy. Improving energy efficiency here primarily means a decrease in traditional fuel energy inputs consumed per unit of products and services (fuel energy contributed to 93% of electricity produced in 2023). A decrease in fuel energy inputs will help achieve effective decarbonization. Thus, ensuring energy efficiency is one of the most important goals for Azerbaijan in achieving decarbonization.

The American Council for an Energy-Efficient Economy (ACEEE), a nonprofit research organization, regularly [publishes](#) its International Energy Efficiency Scorecards. The 2022 International Energy Efficiency Scorecard ranks 25 of the world's largest energy users on 36 efficiency metrics. It scores them on performance metrics, awarding up to 25 points in each of four categories: buildings, industry, transportation, and national efforts. France is ranked as the world leader in energy efficiency, followed by the UK, Germany, the Netherlands and Italy.

Azerbaijan, of course, was not included in this ranking, as it is not among the world's major energy users. But it is interesting to look at the country's energy consumption portfolio under the above four categories. Households [account for](#) 33,5% of total energy consumption in Azerbaijan, with 23% and 13,5% provided by transportation and industry/construction, respectively, and the rest coming from other users. Although the categories of official energy statistics provided by the Republic of Azerbaijan do not coincide with the categories listed in the International Energy Efficiency Scorecard, the current state of energy consumption in the country by sector can be taken as a basis

for any analysis.

Energy consumption in buildings

As can be seen, energy consumption in buildings accounts for the largest share of total energy consumption in Azerbaijan (33,5%). Energy efficiency and energy saving in the category of buildings is the weakest link in Azerbaijan's effort towards decarbonization. The main issue here is the weak protection of heating systems in buildings, the presence of individual heating systems in most buildings, their non-compliance with modern energy efficiency standards and, consequently, large losses in energy consumption.

To address this problem, the government must adopt a state strategy to improve energy efficiency in buildings. In 2022, for example, the Rule Book *Thermal Protection of Buildings. Design Norms* was approved by a [decision](#) of the State Committee for Urban Planning and Architecture. This book outlines specific requirements for the protection of space heating. But these requirements can only be met in new buildings, but are either impossible or quite difficult to fulfill in old buildings of the Soviet era. The book does not make it clear on how older buildings can meet these requirements. In addition, this issue is not reflected in detail in the Law on [Efficient Use of Energy Resources and Energy Efficiency](#), nor in any document related to the newly established [Energy Efficiency Fund](#).

A radical solution to the problem of energy efficiency in buildings is the implementation of renewable energy projects and the participation of individual producers in these projects. The government seems to be interested in renewable energy projects. For example, the Energy Efficiency Fund contains provisions to enable its implementation by transferring excess energy from solar panels installed by individual consumers into a common system to be set up for this purpose. However, such provisions have yet to be

implemented, and there have been no real results from the implementation of renewable energy projects as a whole.

Energy consumption in transportation

The situation in Azerbaijan's transportation sector is also unsatisfactory. The world's leading countries plan to achieve net-zero carbon emission goals by 2050. But Azerbaijan has no commitments in this regard yet. However, carbon emissions continue to be high. Note that in 2024, for the first time in history, decarbonization [became](#) a top priority for a majority of the world's countries, surpassing energy security.

The greatest contribution to the reduction of carbon emissions in transportation is the transition of Azerbaijan's fleet to electric vehicles. In Azerbaijan, however, imported electric vehicles account for only about 2-3% of total car imports. EV charger installations are virtually non-existent. More recently, on 7 March 2024, the president signed the [Decree](#) to Encourage the Use of Electric-Powered Vehicles, which directs the installation of electric vehicle charging points.

And as I mentioned above, the government does not have a clear strategy for energy efficiency in general. The lack of such a strategy makes it difficult to build energy efficiency infrastructure, which results in the existing gaps.

Energy consumption in industry

The oil and gas sector accounts for 91% of Azerbaijan's industry. The amount of energy consumed here is relatively large, but unfortunately, there are few opportunities to improve sector's efficiency. As in the case of transportation, the government does not have the will to change producer and consumer behavior in order to shift interest to carbon-free energy sources on a large scale. This is due to the fact that projects under production sharing agreements (PSAs) implemented with international companies apply modern energy consumption standards, yet revolutionary changes in this area

in a very short space of time seem unrealistic for older SOCAR-owned oilfields. Therefore, the industrial sector's ability to improve energy efficiency in the country is limited.

National efforts: Public governance in the energy sector

After the Azerbaijani National Assembly ratified the Paris Agreement under the United Nations Framework Convention on Climate Change in 2016, the government's commitments to decarbonization and the creation of a new legislative framework over the past few years have undoubtedly been welcome developments. But the system of energy sector governance and especially the market structure pose major risks in terms of achieving a positive result from those efforts.

Azerbaijan's weakest point in the field of energy efficiency is management and ownership. The energy sector is an area where privatization has been the least widespread since independence. The domestic energy sector is largely owned by the government. Only a few small hydropower plants are privately owned and account for less than 1% of electricity production. Azerbaijan's electricity market is dominated by a state-owned, vertically integrated monopoly that does not allow for a competitive environment. The government both owns and manages the energy sector. The easier it is to ensure energy security, the more difficult it is to achieve energy efficiency through flexible market instruments.

The Ministry of Energy, Azerenerji, Azerishiq and the Tariff (Price) Council are players in the energy sector. The Ministry of Energy is the central executive authority responsible for implementing state policy for the sector. Azerenerji is a vertically integrated company responsible for electricity generation and transmission throughout the country, with the exception of Nakhchivan AR. Azerishiq is a 100% state-owned enterprise responsible for electricity distribution, supply,

and other customer services (connection, metering, and billing). The Tariff (Price) Council is the collegial executive body designated to determine retail and wholesale tariffs for electricity, gas, district heat and refined petroleum products, as well as purchase tariffs for renewable electricity.

Like other natural monopolies, generators and distributors in the energy sector operate mostly at a loss, regularly increasing the selling price to consumers by resolution of the Tariff (Price) Council, with a second price increase achieved after some time under the assumption that they are still operating at a loss. However, the problem of unprofitability remains unresolved. We should also note that the energy sector is one of the biggest beneficiaries of foreign financial institutions. At the same time, subsidies to the energy sector remain high. Azerbaijan's energy price subsidies in 2018 were three times higher than in 2010 according to IEA estimates, [amounting to](#) USD 2,6 billion, or 5,8% of GDP.

Naturally, the energy sector is different from other market segments where it is impossible to set principles for perfect competition. Nevertheless, there are mechanisms for effective management of natural monopolies, and they are successfully implemented in most countries as part (in the context) of the state's regulating policy. The main issue is to find a consensus (trade-off) between the regulatory function of the state and the principles of supply and demand in the market.

Consumer behavior

With a view to building energy efficiency, the above-mentioned suggestions are important conditions for improvements in technology, innovation and management in general. However, it should be borne in mind that all this is possible due to radical changes in consumer behavior. Energy efficiency improvements in every sector of the economy, whether buildings or transportation, if consumer behavior does not change, are

quite difficult even through the most revolutionary technologies. But it should also be noted that the relationship between consumer behavior and technology is relatively reciprocal, as new technology can in turn motivate consumers to change their behavior. Research has shown that 30% of the potential energy savings of high efficiency technologies [is lost](#) due to a variety of social, cultural, and economic factors. In this regard, indirect influences on human behavior—for example, applying the idea of a “[gentle nudge](#)”—are of crucial importance.

Conclusion

Thus, whatever successive and ambitious moves the Azerbaijani government might commit to or even undertake at this year's COP29, some pitfalls in Azerbaijani energy consumption threaten to hamper positive outcomes. These pitfalls are as follows:

1. The country's business environment is generally not conducive to progress in energy efficiency. So far, non-oil industries have at best focused on providing employment. Economic efficiency and energy efficiency have been relegated to secondary concerns. On the other hand, any inefficient economic activity not only fails to generate revenue, but also requires additional national budget expenditure. The ongoing post-oil era therefore catapulted energy efficiency into the number one priority for Azerbaijan.
2. The private sector in the market structure of the energy sector should be expanded. The public sector has hegemony over the country's energy market. All state-owned enterprises, with the exception of those for the generation and transmission of electricity, should potentially qualify for privatization. In parallel, as an objective, the private sector should set the growth of renewable energy enterprises.
3. The present governance structure in the energy sector is

a legacy of the Soviet era with minor changes. This poor governance is contrary to the government's decarbonization priorities.

4. The current measures of the Azerbaijani government towards decarbonization are insufficient for the country to fulfill its obligations under the Paris Agreement. Much stronger measures than originally planned are now needed.
5. Energy efficiency requires significant changes not only in government behavior but also in consumer behavior. The behavior of the average Azerbaijani energy consumer is uneconomic. If until now the government has assessed this energy consumption as a producer-related activity, then it needs to shift the center of gravity, to promote a more cost-effective approach to consumer behavior and to take vigorous and consistent steps towards the inclusiveness of energy efficiency.