ENERGY EFFICIENCY TRANSFORMATION IN UZBEKISTAN: STATE POLICY, FISCAL, AND FINANCIAL MECHANISMS
ТРАНСФОРМАЦИЯ ЭНЕРГЕТИЧЕСКОЙ ЭФФЕКТИВНОСТИ В УЗБЕКИСТАНЕ: ГОСУДАРСТВЕННАЯ ПОЛИТИКА, ФИСКАЛЬНЫЕ И ФИНАНСОВЫЕ МЕХАНИЗМЫ

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Abstract. This study examines Uzbekistan's energy efficiency transformation through state policy, fiscal instruments, and financial mechanisms. Using a qualitative analytical approach, it assesses the institutional framework, energy audits, financial support, ESCO mechanisms, and measurement and verification procedures. The findings indicate a shift toward an integrated framework connecting energy assessment, investment financing, implementation, and performance measurement to support energy efficiency and green economic transformation.

Keywords: Energy efficiency; fiscal instruments; financial mechanisms; energy audits; ESCO; green economy; Uzbekistan.

Аннотация. В статье рассматривается трансформация энергоэффективности в Узбекистане через взаимодействие государственной политики, фискальных инструментов и финансовых механизмов. На основе качественного аналитического подхода оцениваются институциональная система, энергетический аудит, меры финансовой поддержки, механизмы ESCO, а также процедуры измерения и верификации. Результаты показывают переход к интегрированной модели, связывающей оценку энергоэффективности, финансирование инвестиций, реализацию мероприятий и измерение их результатов.

Ключевые слова: энергоэффективность; фискальные инструменты; финансовые механизмы; энергетический аудит; ESCO; зеленая экономика; Узбекистан.

I. Inroduction

One of the most important directions in the country's transition to a green economy is improving energy efficiency. For a country like Uzbekistan, which aims to sustain rapid economic growth while experiencing a relatively high rate of population growth, making energy efficiency a key priority is a natural and increasingly important part of the transition toward a greener economy.

Uzbekistan's relatively high energy intensity highlights the importance of improving energy efficiency as part of its broader economic transformation. According to the International Energy Agency (IEA), although Uzbekistan's per capita energy consumption is

around one-quarter below the global average, its economy remains highly energy-intensive, with energy consumption per unit of GDP more than 50% above the world average. The IEA also notes that Uzbekistan's energy use declined by approximately 14% between 2010 and 2020, reaching around 33 million tonnes of oil equivalent (Mtoe), while substantial potential for further efficiency improvements remains across major sectors of the economy (IEA, 2022). The World Bank similarly identifies the high energy intensity of Uzbekistan's economy as being closely associated with historically low, below-cost energy tariffs and substantial energy subsidies, which have contributed to inefficient resource use. In 2020, energy subsidies were estimated at 6.6% of GDP (World Bank, 2023). These indicators suggest that reducing energy intensity in Uzbekistan requires not only technological modernization but also structural and policy measures capable of encouraging more efficient energy use and investment.

In response to these challenges, Uzbekistan has been increasingly strengthening its institutional and policy framework for improving energy efficiency. A significant step in this direction was the establishment of the National Agency for Energy Efficiency under the Cabinet of Ministers in 2025. The Agency was assigned a broad range of responsibilities, including coordinating state policy on energy efficiency, developing the energy audit system, supporting energy-efficient investment projects, developing the ESCO market, and promoting more rational energy use among households and businesses. At the same time, a number of financial support instruments have been introduced to encourage energy efficiency investments, including subsidies for energy audits, support for solar energy and heating technologies, and partial compensation of interest expenses on green loans.

Recent policy initiatives also indicate a shift from individual energy-saving measures toward a more systematic approach to energy efficiency management. In particular, the proposed framework for improving the energy audit system envisages mandatory energy audits for entities included in the State Energy Register, energy performance classification of buildings, energy passports, benchmarking, risk-based monitoring, and measurement and verification of achieved energy savings. It also links the results of energy audits with the identification of energy-saving measures, investment requirements, capital and operating costs, economic efficiency, and implementation roadmaps.

Research gap

Despite these developments, there remains a limited understanding of how Uzbekistan's emerging institutional framework, fiscal incentives, and financial mechanisms can function as an integrated system for promoting energy-efficiency investment. Existing policy initiatives have introduced a range of instruments, including energy audits, subsidies, preferential financing, ESCO mechanisms, and performance monitoring. However, these instruments are generally considered as separate components, while the links between energy-efficiency assessment, investment decision-making, public support, private financing, and measurement of achieved savings remain insufficiently examined. In particular, limited attention has been given to how the results of energy audits can be translated into investment decisions, how fiscal support can reduce investment barriers, and how private financing mechanisms can contribute to the implementation and verification of energy-efficiency measures. This creates a research gap concerning the development of an integrated policy and financing framework for accelerating energy efficiency transformation in Uzbekistan.

Research Questions

Based on the identified research gap, this study examines Uzbekistan's energy efficiency transformation from three interconnected perspectives: the institutional and policy framework, the role of fiscal and financial mechanisms in stimulating investment, and the integration of these instruments into a coherent energy efficiency mechanism. Accordingly, the study addresses the following research questions:

RQ1. What are the key features and gaps in Uzbekistan's current institutional and policy framework for improving energy efficiency?

RQ2. What fiscal and financial mechanisms can be used to stimulate investment in energy efficiency in Uzbekistan?

RQ3. How can energy audits, performance measurement, fiscal incentives, and private financing be integrated into an effective energy efficiency mechanism in Uzbekistan?

Literature review

In last dacedes, energy efficiency has become an important component of sustainable economic development and the transition toward low-carbon growth. In the economic literature, energy efficiency is generally associated with the ability to generate a given level of economic output or energy service with lower energy consumption. Consequently, improvements in energy efficiency can contribute simultaneously to economic, environmental, and energy-security objectives. IEA identifies energy efficiency as one of the most cost-effective means of strengthening energy security, improving competitiveness and welfare, and reducing the environmental footprint of energy systems (IEA, 2019). This broader perspective indicates that energy efficiency should not be considered solely as a technical issue, but also as an important element of economic policy and structural transformation.

A central concept in this literature is energy intensity, commonly measured as energy consumption per unit of gross domestic product. A decline in energy intensity is often interpreted as an improvement in the efficiency with which an economy uses energy to generate economic value. However, changes in aggregate energy intensity do not necessarily reflect technological improvements alone. They may also result from changes in the sectoral composition of economic activity. OECD analysis demonstrates that structural factors can either reinforce or offset the effects of technical energy-efficiency improvements. In particular, a shift toward less energy-intensive sectors can reduce aggregate energy intensity even in the absence of equivalent improvements in the efficiency of individual production processes (IEA, 2019).

The distinction between technical efficiency and structural change is therefore important when assessing the relationship between economic growth and energy consumption. Empirical research on OECD economies has shown that changes in sectoral composition account for a significant part of observed energy-intensity dynamics, while energy intensity has also declined in many manufacturing sectors over time (Mulder and de Groot, 2012). This suggests that improvements in energy efficiency should be assessed not only through aggregate energy-intensity indicators but also through technological modernization, sector-specific energy performance, and changes in the structure of economic activity.

The relationship between economic growth and energy consumption has also received considerable attention in the literature on decoupling. The IEA reports that energy consumption and economic growth have increasingly shown signs of decoupling in a number of economies, with improvements in energy intensity playing an important role. Under the

IEA's Sustainable Development Scenario, additional energy-efficiency improvements represent a major source of projected energy savings, particularly in industry, buildings, and transport (IEA, 2019). At the same time, the literature cautions against assuming that efficiency improvements automatically lead to proportional reductions in total energy consumption. Economy-wide rebound effects may partly offset the expected energy savings because lower energy costs or increased productivity can stimulate additional consumption and economic activity (Brockway et al, 2021).

More recent evidence reinforces the importance of energy efficiency for maintaining economic growth while reducing energy demand and environmental pressures. The IEA estimates that improvements in energy efficiency have allowed economies to accommodate substantial economic expansion without a corresponding increase in final energy demand. In IEA member countries, for example, final energy demand remained broadly stable over two decades while real economic output increased substantially, reflecting the cumulative contribution of efficiency improvements and changes in economic structure (IEA, 2022).

From a green-transition perspective, energy efficiency therefore represents an important mechanism through which economic development can become less dependent on energy consumption and associated emissions. However, the literature indicates that achieving such a transition requires more than technological improvements. The pace of energy-efficiency improvement depends on investment, market incentives, institutional arrangements, energy prices, and the policy environment. This is particularly relevant for emerging economies, where rapid growth in industrial production, urbanisation, infrastructure, and household energy demand can create additional pressure on energy systems. Energy efficiency in this context becomes not simply a means of reducing energy consumption, but a mechanism for improving the productivity of energy resources while supporting continued economic development.

This perspective is particularly relevant to Uzbekistan. The World Bank characterises Uzbekistan as an energy-intensive economy and argues that decarbonisation of the energy-intensive economic structure can contribute to the country's development objectives and improvements in living standards (World Bank, 2023). Thus, the energy-efficiency challenge in Uzbekistan should be understood within the broader process of economic transformation: reducing energy intensity requires improvements in technologies and infrastructure, but also changes in incentives, investment behaviour, institutional capacity, and the allocation of financial resources. This provides a basis for examining the institutional and policy mechanisms through which governments can translate the economic potential of energy efficiency into actual investment and energy savings.

The literature increasingly emphasizes that energy efficiency is not determined by technological potential alone, but also by the institutional and policy environment in which energy-related decisions are made. Governments use a combination of regulatory, informational, and incentive-based instruments to influence the behaviour of households, firms, and investors. The International Energy Agency identifies regulation, information, and incentives as three complementary pillars of effective energy-efficiency policy, arguing that their coordinated implementation is more effective than relying on individual measures in isolation (IEA, 2024). Regulatory measures can establish minimum performance requirements, while information instruments reduce information asymmetries and incentives improve the financial attractiveness of energy-efficiency investments.

Regulation is particularly important in sectors where consumers and firms face limited information or where the benefits of efficiency investments materialize over a relatively long period. Building energy codes, minimum energy performance standards, mandatory energy audits, energy-management requirements, and energy-performance certification can establish common performance requirements and create more predictable conditions for investment. At the same time, information-based measures such as benchmarking, energy labels, energy audits, and performance indicators can help economic agents identify efficiency opportunities that may otherwise remain unrecognized (IEA, 2024). The literature therefore suggests that institutional arrangements for collecting, assessing, and communicating energy-performance information are an important part of energy-efficiency policy.

Financial constraints represent another major barrier identified in the literature. Energy-efficiency projects frequently require substantial initial expenditure, while their economic benefits are realized through future reductions in energy consumption and operating costs. This creates a financing challenge because conventional lending decisions may place greater emphasis on collateral and immediate cash flows than on future energy savings. Recent policy research therefore highlights the importance of preferential loans, grants, tax incentives, guarantees, risk-sharing mechanisms, and other forms of public support that can reduce investment risks and mobilise private capital for energy-efficiency projects (IEA, 2026). In this context, public financial intervention does not necessarily replace private finance; rather, it can improve the risk-return profile of projects and facilitate the participation of commercial financial institutions.

The role of Energy Service Companies (ESCOs) has also received increasing attention as a mechanism for overcoming financing and technical barriers. ESCO models can combine technical expertise, project implementation, financing arrangements, and performance-based remuneration, allowing energy consumers to undertake efficiency improvements without bearing all of the initial financial and technical risks themselves. A recent systematic review of the ESCO literature shows that research has increasingly focused on business models, market development, and energy performance contracting, while risk management and market evaluation remain important areas for further research (Cebekhulu et al., 2024). This indicates that the effectiveness of ESCO mechanisms depends on the existence of appropriate contractual, regulatory, and financial conditions.

These findings are relevant to Uzbekistan because the country's energy-efficiency transformation is increasingly moving from individual energy-saving measures toward a broader institutional and financing framework. The emerging policy approach combines energy audits and performance assessment with financial support, investment mechanisms, ESCO development, and monitoring of energy savings. From the perspective of the existing literature, the key issue is therefore not simply whether individual instruments are available, but whether they can operate as complementary components of a single mechanism. This creates a basis for examining how fiscal and financial instruments can support energy-efficiency investment and how energy audits, financing mechanisms, and measurement of results can be connected within Uzbekistan's institutional framework.

The reviewed literature demonstrates that energy efficiency should be approached as a multidimensional economic and policy issue rather than as a purely technological objective. The existing studies establish several important relationships. First, improvements in energy efficiency can contribute to lower energy intensity, greater energy security, improved

economic competitiveness, and reduced environmental pressures. Second, the effectiveness of efficiency improvements depends on the institutional and regulatory environment, including standards, information systems, monitoring, and enforcement. Third, financing conditions are critical because the technical and economic potential of energy-saving measures does not automatically translate into actual investment. Finally, mechanisms such as ESCOs, energy performance contracting, and measurement and verification can help connect identified energy-saving opportunities with implementation and financing.

At the same time, the literature indicates that these elements are frequently examined separately. Studies on energy efficiency and economic growth primarily focus on energy intensity, technological change, structural transformation, and rebound effects. Policy-oriented research tends to concentrate on regulatory instruments, standards, information measures, and institutional capacity. Another strand of the literature examines financing barriers and the role of subsidies, concessional finance, guarantees, and private capital, while research on ESCOs focuses on contractual arrangements, performance-based financing, and market development. Although these strands are complementary, relatively less attention has been given to how they can be combined into an integrated policy and financing mechanism within a specific national institutional context.

This perspective is especially important in the case of Uzbekistan. Existing international studies provide a broad analytical basis for understanding energy efficiency, but relatively limited academic attention has been devoted to the emerging institutional and financial architecture of energy efficiency in Uzbekistan. In particular, there is a need for further examination of how the country's developing energy-audit system, financial support instruments, ESCO mechanisms, investment incentives, and performance-monitoring arrangements can interact within a single policy framework. This is important because the effectiveness of energy-efficiency policy depends not only on the formal availability of individual instruments but also on their coordination and ability to support the full investment cycle.

Accordingly, the main research gap identified from the literature is the limited analysis of the interaction between institutional arrangements, fiscal incentives, financial mechanisms, energy audits, and performance measurement in Uzbekistan's energy-efficiency transformation. Existing literature provides substantial evidence on individual components of this system, but does not sufficiently explain how these components can be integrated to overcome investment barriers and convert identified energy-saving potential into measurable economic and energy savings. Addressing this gap requires an approach that considers energy efficiency simultaneously as a policy, institutional, and investment process.

The present study contributes to this discussion by examining Uzbekistan's energy-efficiency transformation through the interaction of state policy, fiscal instruments, and financial mechanisms. It focuses not only on the existence of individual policy measures, but also on their institutional linkages and their potential to form a coherent mechanism connecting energy assessment, investment decision-making, financing, implementation, and measurement of results. In this way, the study seeks to extend the existing literature by providing an integrated assessment of the policy and financing architecture supporting energy-efficiency transformation in Uzbekistan.

II. Methodology

This study applies a qualitative analytical approach to examine energy-efficiency transformation in Uzbekistan. The analysis combines policy and institutional analysis with an

assessment of fiscal and financial mechanisms supporting energy-efficiency investment. The study uses national regulatory documents, government policy materials, and reports and analytical publications of international organisations, including the IEA and World Bank.

The analysis focuses on four interconnected elements: (i) the institutional and regulatory framework for energy efficiency, (ii) fiscal and financial instruments supporting investment, (iii) energy audits and ESCO mechanisms, and (iv) measurement and verification of energy savings. These elements are assessed in terms of their institutional responsibilities, implementation mechanisms, financing conditions, and potential to support investment and measurable energy savings.

III. Results

Institutional and Policy Framework

Uzbekistan has recently strengthened its institutional framework for energy efficiency. In March 2025, the National Energy Efficiency Agency was established under the Cabinet of Ministers with responsibility for coordinating state policy, developing the ESCO market, supporting high-efficiency projects and private investment, and establishing a system for training and registering energy auditors.

The emerging policy framework combines institutional reform with direct financial support. For households, the existing measures include full coverage of energy-audit costs, a 20% subsidy for solar panels, solar collectors and domestic heating boilers, and a subsidy covering up to 40% of heat-pump costs. Interest expenses on green loans are also partially compensated. For businesses, support includes partial compensation of interest on loans for solar installations in textile enterprises and subsidies for heat pumps used by greenhouse farms.

The scale of implementation also indicates a gradual transition from individual measures toward programme-based energy-efficiency interventions. In 2025, reported measures included 969 thousand m² of thermal insulation, 21.8 thousand kW of solar panels, 430 solar collectors and 965 heat pumps. In addition, 2.9 thousand heating boilers and 14,800 automatic burners were renewed, generating reported annual savings of 2.9 million kWh of electricity and 8.8 million m³ of natural gas.

A further development is the increasing use of energy audits as a basis for investment decisions. Under the emerging framework, energy-efficiency projects are increasingly linked to energy audits, while energy performance monitoring, auditor training, ESCO mechanisms and digital data systems are being developed as complementary elements. The policy direction therefore indicates a shift from subsidising individual technologies toward establishing an institutional system that connects assessment, investment, implementation and monitoring.

The scale of the planned transformation is also reflected in the national targets. These include improving energy efficiency in social and public buildings, conducting energy audits of 371 industrial enterprises, training more than 1,000 energy auditors by 2030, developing the ESCO market, and achieving significant reductions in electricity and gas consumption.

Fiscal and Financial Mechanisms

Uzbekistan’s emerging energy-efficiency policy combines direct subsidies, preferential financing, interest-rate compensation, and investment programmes. In 2025, 588.3 billion soums in preferential loans and subsidies were allocated to households to encourage energy-efficiency improvements, including green renovations and related measures.

Financial support is also being extended to businesses and infrastructure. For example, interest expenses on loans for solar installations in textile enterprises are partially compensated, while 25 billion soums is planned for the renewal of drinking-water pumps through energy-service-contract arrangements. In addition, financing is being mobilised through international financial institutions, with approximately US$539 million identified for energy-efficiency projects.

These instruments indicate that public financing is increasingly being used to reduce the initial investment barrier associated with energy-efficiency technologies. At the same time, the emerging approach increasingly involves commercial banks, ESCOs and international financing, suggesting a gradual shift from direct budget support toward mechanisms capable of mobilising private investment. The effectiveness of this transition, however, will depend on the development of reliable energy audits, project assessment, and measurement and verification systems.

Energy Audits, ESCOs and Measurement and Verification

The emerging energy-efficiency framework in Uzbekistan places energy audits at the centre of investment planning and performance assessment. The proposed framework establishes a system in which mandatory energy audits are conducted by qualified auditors included in a unified register, while audit procedures and contracts are managed through a digital platform. The framework also introduces different audit types, including initial, periodic, express, extraordinary, and targeted audits, allowing the depth of assessment to be adjusted to the characteristics and energy-performance risks of the consumer.

A particularly important feature is the connection between energy audits and investment decisions. The proposed methodology uses energy-performance indicators (EnPI), baseline energy performance indicators (EnB), and energy-performance improvement opportunities (EPIO) to assess efficiency potential. Measurement and verification (M&V) is defined as the process of measuring and confirming the actual savings achieved after energy-efficiency measures are implemented. For investment-oriented measures, M&V results are intended to provide evidence of the actual energy savings achieved, thereby strengthening the link between technical assessment and financial decision-making.

The proposed digital platform further strengthens this mechanism by integrating energy-audit procedures, auditor registration, energy-performance data and monitoring. The National Agency's plans also envisage the integration of information from energy and other relevant systems, as well as the use of digital technologies in energy audits and project development.

ESCO mechanisms represent another component of the emerging system. The National Agency reports that Uzbekistan has joined the Global ESCO Network and is developing an ESCO-based approach for improving the energy efficiency of social-sector facilities and other consumers. The reported targets include making 5,000 social-sector facilities more energy efficient and generating substantial electricity and natural-gas savings through ESCO arrangements. These figures represent planned results rather than outcomes already achieved.

Integrated Energy Efficiency Mechanism

The analysis of Uzbekistan’s current policy framework indicates that the country is moving toward an integrated mechanism in which institutional, fiscal, financial, and technical instruments complement each other. The National Agency for Energy Efficiency provides the institutional coordination function, while subsidies and preferential financing reduce the

initial investment burden. Energy audits identify energy-saving opportunities and estimate their technical and economic potential, while ESCO arrangements can provide an alternative implementation and financing channel. The proposed M&V framework then provides a basis for determining and verifying the savings achieved.

From this perspective, the emerging mechanism can be represented as a continuous investment cycle. First, energy consumption and efficiency performance are assessed through audits and performance indicators. Second, technically and economically viable measures are identified together with their investment requirements and expected savings. Third, projects can be financed through public subsidies, preferential loans, international financing, private investment, or ESCO arrangements. Fourth, the implemented measures are monitored and their results are verified through M&V. Finally, verified savings provide information for further monitoring, investment planning, and improvement of energy-efficiency programmes. The proposed framework explicitly connects energy-performance indicators and M&V with energy-saving programmes and the assessment of achieved results.

This integrated approach is particularly relevant for public and social-sector facilities, where large-scale modernization programmes are increasingly being linked to energy audits. The National Agency reports that project documentation for the modernization of social-sector facilities is being developed on the basis of energy-audit reports and that energy-efficiency measures are incorporated into the modernization process. International financing is also being mobilised for energy-efficiency projects, including measures targeting schools, kindergartens, and medical facilities.

The results therefore suggest that Uzbekistan's energy-efficiency transformation is evolving from a predominantly technology-support approach toward a broader policy–finance–performance framework. Its central feature is the connection between identifying energy-saving potential, mobilising finance, implementing efficiency measures, and verifying their actual outcomes. At the same time, the analysis indicates that many elements of this mechanism remain at the stage of institutional development or planned implementation. Consequently, its long-term effectiveness will depend on the practical coordination of the institutions, financing instruments, ESCO market, audit system, and M&V procedures.

IV. Discussion

The findings of this study indicate that Uzbekistan's energy-efficiency transformation is increasingly moving beyond isolated technological interventions toward an institutional and investment-oriented framework. This development is consistent with the broader literature, which emphasizes that energy efficiency depends not only on technological improvements but also on regulation, information, incentives, financing conditions, and institutional capacity. In the Uzbek context, the establishment of a dedicated institutional structure and the development of energy-audit, ESCO, financing, and M&V mechanisms indicate an attempt to address these dimensions simultaneously.

The findings also reinforce the importance of financial mechanisms in translating energy-saving potential into actual investment. The availability of subsidies, preferential loans, interest-rate compensation, and international financing can reduce the initial capital barrier faced by households, businesses, and public institutions. However, public financial support alone is unlikely to be sufficient for large-scale transformation. The emerging involvement of commercial banks, international financial institutions, and ESCOs suggests the potential for a gradual transition toward greater mobilisation of private capital. This is

particularly important because many energy-efficiency investments generate returns through future energy-cost savings rather than immediate revenues.

A further implication concerns the role of energy audits. The analysis shows that Uzbekistan is developing an approach in which audits are increasingly connected with investment planning rather than being treated simply as diagnostic exercises. The use of energy-performance indicators, baseline measurements, estimates of investment requirements, and M&V procedures can improve the quality of investment decisions by providing a more systematic assessment of expected and achieved savings. This corresponds with the literature's emphasis on reducing information asymmetries and improving the reliability of energy-performance information.

The findings also highlight the importance of coordination among policy instruments. A subsidy without adequate project assessment may support investments with limited efficiency potential, while an energy audit without access to finance may identify technically viable measures that remain unimplemented. Similarly, financing mechanisms require reliable information on expected and achieved savings, particularly where repayment or remuneration is linked to energy performance. The emerging Uzbek framework therefore suggests that the effectiveness of individual instruments depends partly on the availability of complementary institutional mechanisms.

At the same time, the analysis identifies several implementation challenges. Many elements of the emerging framework remain under development, meaning that the formal availability of an instrument does not necessarily imply its effective operation at scale. The development of qualified energy auditors, reliable data systems, capable ESCOs, standardised M&V procedures, and effective coordination between public institutions and financial intermediaries will be important for translating policy design into measurable energy savings. Thus, the central challenge is not simply expanding the number of available instruments, but ensuring that they operate as parts of a coherent investment and performance-management system.

Overall, the findings support the proposition that energy efficiency in Uzbekistan should be approached as an integrated economic policy process. The combination of institutional coordination, fiscal support, financial mobilisation, energy auditing, ESCO implementation, and M&V provides a potential mechanism for connecting policy objectives with investment decisions and measurable outcomes. The effectiveness of this mechanism, however, will ultimately depend on its implementation quality, institutional coordination, and ability to mobilise sustained investment beyond direct public support.

Conclusion

Uzbekistan’s energy-efficiency transformation is increasingly developing from a set of individual energy-saving measures toward a more integrated institutional, fiscal, and financial framework. The findings show that the establishment of the National Agency for Energy Efficiency, the expansion of financial support instruments, the development of energy-audit procedures, the promotion of ESCO mechanisms, and the introduction of measurement and verification arrangements are creating the main elements of such a system.

The analysis demonstrates that fiscal and financial mechanisms have an important role in overcoming the investment barriers associated with energy-efficiency improvements. Subsidies, preferential financing, interest-rate compensation, and international financial resources can reduce initial investment constraints, while ESCO mechanisms and commercial financing can provide additional channels for mobilising private capital. However, the

effectiveness of these instruments depends on the availability of reliable information about energy-saving potential and the ability to measure and verify actual results.

The study also finds that energy audits can serve as an important connecting mechanism between policy objectives and investment decisions. By identifying energy-saving opportunities, estimating investment requirements and expected savings, and establishing a basis for subsequent M&V, energy audits can help transform technical efficiency potential into implementable projects. In this context, the emerging digital infrastructure and unified energy-performance information systems can further strengthen monitoring and coordination.

The main policy implication is that Uzbekistan's energy-efficiency policy should increasingly focus on the integration of instruments rather than their isolated application. An effective mechanism requires coordination between institutional responsibilities, energy audits, fiscal incentives, financial institutions, ESCOs, project implementation, and M&V. Such integration can improve the allocation of public support, reduce investment risks, and strengthen the connection between energy-efficiency expenditure and measurable energy savings.

At the same time, the findings should be interpreted in light of the current stage of institutional development. Several mechanisms examined in the study are still being established or proposed, and therefore their long-term effectiveness cannot yet be assessed solely on the basis of realised outcomes. Future research could examine the quantitative effects of individual fiscal instruments on energy-efficiency investment, evaluate the performance of ESCO projects, and develop indicators for measuring the effectiveness of the emerging integrated mechanism.

Overall, the study concludes that energy efficiency in Uzbekistan should be treated not only as a technological or energy-sector objective, but as a broader economic, fiscal, financial, and institutional transformation process. The development of an integrated mechanism connecting energy assessment, investment financing, implementation, and verification represents an important direction for strengthening the contribution of energy efficiency to sustainable economic growth and the country's green transition.

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