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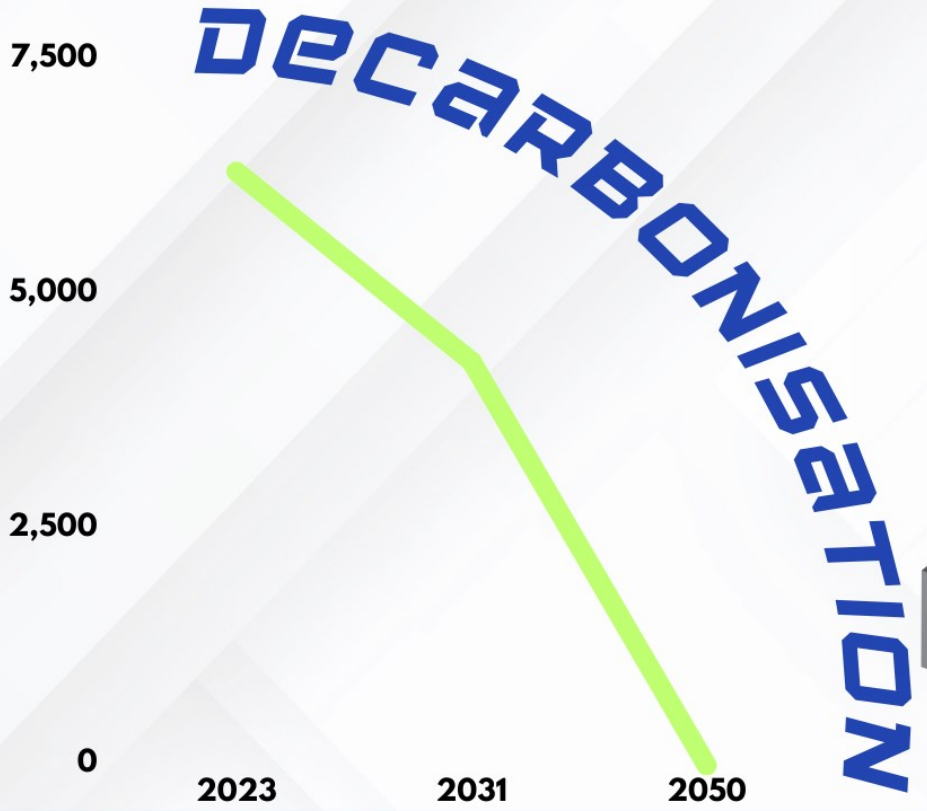
# Energy Transition Index in Kosovo Recommendations for the Year 2023

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## 1. INTRODUCTION

The energy transition in Kosovo is about more than just the energy mix, technology, or emissions. Moving from lignite to cleaner energy is a difficult task that is not comparable to any recent reform or transformation carried out by Kosovan society. Delaying the decision on energy transition and tangible commitments to climate neutrality by 2050 in Kosovo is another risky strategy because the resources needed for the transition will go unused and may even be lost over time.

Moreover, the coal phase-out, large-scale deployment of renewables for power, establishing energy efficiency standards across energy supply chains, or opening the door to rooftop solar PV installations all have an impact on society as a whole. The first two cases necessitate changes to land use patterns across a large area. Decisions to deploy more wind resources or large solar plants have socioeconomic and spatial consequences, albeit on a smaller scale. It is a process that must be preceded by societal change, which has greatly contributed to the emergence and popularization of the concept of energy democracy in recent years.

The urgency of changing the current energy model and transitioning to a more sustainable one is widely acknowledged by policymakers and scientists around the world.[1] In line with this, it has been clearly determined that the increased use of fossil fuels must be reduced in order to keep the global temperature increase to less than 2 degrees Celsius.[2] However, the pandemic, the steep economic rebound, and the war in Ukraine have successively disrupted energy markets, causing significant consequences for people, companies, and economies around the world. This situation demonstrates that the energy transition is not immune to the effects of major environmental, economic, and geopolitical events and that trade-offs exist and must be carefully considered between energy affordability, security, and sustainability.

In this context, the World Economic Forum[3] has introduced a comprehensive proxy for the Energy Transition Index (ETI)[4], which includes two main sub-indices; *the energy System Performance Index and Transition Readiness.* Therefore, the main goal of this paper was to develop a reliable ETI index system that captures the key aspects of the energy transition while considering Kosovo's unique characteristics (for example, the country's heavy reliance on coal in its energy system). Additionally, to define the perspectives of the transition to zero-emission till 2050 and outline the main measures for the year 2023 for reaching this goal.

The International Energy Agency (IEA)[5] recently found that achieving the 1.5°C goal would require no new final investment decisions for unabated coal plants and the phasing out of less efficient coal plants by 2030, with any remaining assets retrofitted with carbon capture and storage (CCS) by 2040. However, implementing the energy transition from fossil-based systems of energy

[1] IEA (2021). Net Zero by 2050: A Roadmap for the Global Energy Sector. OECD Publishing, Paris
[2] McGlade, C.; Ekins, P. (2015). The geographical distribution of fossil fuels unused when limiting global warming to 2 °C. *Nature 517*, 187–190.
[3] World Economic Forum is the Swiss nonprofit foundation established in 1971, based in Geneva, Switzerland.
[4] World Economic Forum (2018) Energy Transition Index
[5] IEA (2021). Net Zero by 2050: A Roadmap for the Global Energy Sector. OECD Publishing, Paris

production and consumption to renewable energy sources is complex, involving not only radical technological changes but also deep socioeconomic and political structural changes.

It also requires investment in related infrastructure, as well as market incentives, public education, and other policy and governance support measures.[6] As of the end of 2021, countries responsible for 90% of global emissions have announced or are considering net-zero targets.[7] In this regard, Kosovo, by signing the Sofia Declaration,[8] on the Green Agenda for the Western Balkans, on November 10, 2020, recognizes the European Green Deal as a new growth strategy for the EU with a view to modernity, a climate-neutral and competitive resource-efficient economy. In the Declaration, Kosovo pledged to transpose and implement EU legislation related to the EU Emissions Trading Scheme and gradually phase out coal subsidies.[9]

However, currently, the energy transition through the Green Agenda finds Kosovo utterly unprepared and with serious problems to cope with the demands from the energy system on one hand and customer supply requirements on the other. The energy sector, specifically that of electricity production, continues to remain one of the most problematic sectors in Kosovo. Consumers are faced with a low-quality and unstable supply of electricity, which has become a barrier to the country's economic development. To achieve Kosovo's carbon peaking and carbon neutrality goals, specific low-carbon roadmaps are required rather than one-size-fits-all approaches. Depending on their current energy system performance and transition readiness, all countries should be mandated with different emissions reduction and energy transition targets.

The Government of Kosovo recently adopted the energy strategy 2022-2031. The strategy envisages that by the end of 2031, 1,400 MGW of energy capacity will be installed from renewable sources. Despite its commitment to a greener future as part of its EU accession process, the country continues to struggle with air pollution, waste management issues, and inefficient energy market liberalization. As a result of the improper treatment of this sector for more than two decades, Kosovo continues to have a high dependence on the unplanned import of electricity. In circumstances where a huge part of current generating capacities (TPP Kosova A and Kosova B) passed their operating limits due to large depreciation technology and time, the issue of energy treatment becomes even more urgent. As Kosovo faces the grand societal challenges of climate change and the greening of energy systems, the government is confronted with the challenge of designing and implementing workable policy strategies.

Meeting Kosovo's energy challenges will necessitate a thorough understanding of the current state of the energy transition. By aggregating a wide range of variables and energy indicators from

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[6] Geels, F.W., Sovacool, B.K., Schwanen, T.,and Sorrell, S. (2017). Socio technical transitions for deep decarbonization. Science357, 1242–1244. https://doi.org/10.1126/science.aao3760.3.

[7] Climate Action Tracker, "CAT net zero target evaluations", 9 November 2021 update, https://climateactiontracker.org/ global/cat-net-zero-target-evaluations.

[8] Sofia Declaration on the Green Agenda for the Western Balkans, https://www.rcc.int/download/docs/Leaders%20Declaration%20on%20the%20Green%20Agenda%20for%20the%20WB.pdf/196c92cf0534f629d43c460079809b20.pdf

[9] Kosovo is not a signatory to the Paris Agreement, because it has not yet achieved full member status in the United Nations. Therefore, it has not yet submitted a Nationally Determined Contribution (NDC) nor made emission reduction commitments to the United Nations Framework Convention on Climate Change (UNFCCC).

international datasets covering important dimensions of energy System Performance and Transition Readiness, the ETI provides a useful information tool. Tracking these metrics allows for a better understanding of the past and present state of the global energy transition.

The ETI can assist in monitoring the progress and impact of a country's energy policies, benchmarking against peer economies around the world, and identifying priority areas for policy interventions and resource mobilization to accelerate the energy transition. Importantly, the Energy Transition Index tool provides a knowledge base that can be used to improve the future by implementing more informed energy transition policies and investment decisions in Kosovo. Due to its coverage of both energy transition system performance and transition readiness dimensions, we describe in this paper the ETI as the most comprehensive energy transition index available globally. The insights provided by the relationship between these two types of scores demonstrate one way in which decision-makers can use the ETI tool to inform stakeholders and make policy recommendations. Energy democracy is about combining two seemingly different terms, energy, and democracy, and viewing energy issues and energy governance through democratic principles. In essence, energy democracy would imply widespread public participation. This concept is currently lacking in Kosovo there is little interaction of public participation in energy policy development thus the start of active participation of local communities in Kosovo would be the most important factor in achieving democratization of the energy transition process. A positive circumstance is that Kosovo has a good interconnection infrastructure with regional energy networks. Additionally, the transition toward cleaner fuels is considered an essential component to achieve sustainable economic development due to its environmental and health-related implications. Ending the use of unabated coal power is key to a net zero energy transition and climate change mitigation measures. However, we do not know how fast it is feasible to phase out coal in Kosovo.

Further, the purpose of this paper is to develop a basic energy transition index in the context of energy transition and a post-carbon vision for Kosovo, focusing on tracking the country's energy transition and on decision-making processes and the role of evaluation tools. The aim is to highlight the more recent trends from ETI and key topics relevant to this issue and obtain a current view of decision tools for supporting a smooth energy transition in Kosovo. Our paper provides baseline information for the energy transition index on Kosovo's energy transition path until 2050 as well as measures for the year 2023. We explain how the energy system transition and national socioeconomic readiness evolved. We shed light on Kosovo's energy transition and decarbonization roadmap by presenting the current state of energy system performance and transition readiness, as well as identifying the indicators and recommendations to follow to significantly reduce energy and carbon intensity, and thus $CO_2$ emissions, in Kosovo.

This paper does have the following limitations, which should be addressed in future research to provide more accurate assessments of the country's energy transition index. First, due to data constraints, this study did not include explicit measures on the renewable energy industry or its potential development in Kosovo. Second, this is the first time that ETI is being drafted for the energy sector in Kosovo. Incorporating these dimensions and indicators (for example, cumulative solar photovoltaic and wind capacity, renewable power generation, and jobs created in the renewable energy industry) into the ETI index system may improve the results.

## 2. INDEP METHODOLOGY

The International Atomic Energy Agency, in collaboration with other international agencies, proposed the "Energy Indicators for Sustainable Development"[10] to help policymakers evaluate and design programs and strategies for a more sustainable future at the national level. INDEP methodology in use is the blend of the indices from the World Economic Forum the Energy Transition Index (ETI). The ETI provides metrics by which countries can track their progress over time, as well as benchmark against peer economies. This Kosovo ETI would be used as a tool to enhance energy transition literacy among energy sector stakeholders in Kosovo.

We discuss the purpose of energy indices in general and then introduce and place in this landscape the World Economic Forum's Energy Transitions Index (ETI). The ETI is a tool for energy decision-makers that strives to be a comprehensive, global index that tracks the performance of energy systems at the country level. It also incorporates macroeconomic, institutional, social, and geopolitical considerations that provide enabling conditions for an effective energy transition. In this way, the ETI enables a better understanding of the past and present states of energy transition around the country, leading to more informed energy transition policies and investment decisions. We reviewed literature, reports, WEF ETI reports from 2012-2020, etc. that address three key issues relating to fossil fuel decline: the lock-in of carbon-intensive technologies, the feasibility of phasing these technologies out, and the call for just transitions as carbon-intensive technologies are phased out.

This paper can be useful as a guide for the future in evaluating and setting the first ETI score for Kosovo and the use for the yearly reporting by the INDEP organization as well as other energy stakeholders. Furthermore, we analyzed other energy transition-related studies at the sub-regional level focusing only on some parts of the energy transition.

[10] IAEA (2005). Library Cataloguing in Publication Data Energy indicators for sustainable development: guidelines and methodologies. — Vienna: International Atomic Energy Agency, 2005. p. ; 24 cm. ISBN 92–0–116204–9

## 3. WHAT IS THE ENERGY TRANSITION INDEX - ETI

Energy transition has been a permanent phenomenon (i.e. the energy system is always changing). However, previous transitions from primitive forms of power (animals, water, wind, and firewood) to coal, and from coal to liquid and gaseous hydrocarbons (and to a lesser extent nuclear fission) were gradual processes occurring over decades or centuries.[11] energy transition has emerged as a critical policy challenge and a business risk, and there is a need for increased transparency and a fact-based understanding of the progress of energy transition.

In this spirit, the Energy Transition Index (ETI) framework was developed by the World Economic Forum with the ambitious aim of comprehensively monitoring the global energy transition. The heart of the Index is an analytic framework that measures transition as a shift towards an energy system that supports sustainability, security, and access, and towards institutions that enable this performance. Globally, energy systems are experiencing significant and fast change, driven by forces such as technological innovation, changes in consumption patterns, supply dynamics, and policy shifts. ETI introduces the concept of transition readiness. In addition to measuring countries' energy system performance, it evaluates the extent to which countries have created the conditions for businesses and society to seize the opportunities that energy transition offers.

Author Araujo[12] defines energy transition as a shift in the nature and pattern of how energy is utilized in a system, including changes associated with fuel type, access, sourcing, delivery, reliability, or end-use. Fouquet and Pearson[13] describe energy transition as "a switch from an economic system dependent on one or a series of energy sources and technologies to another".

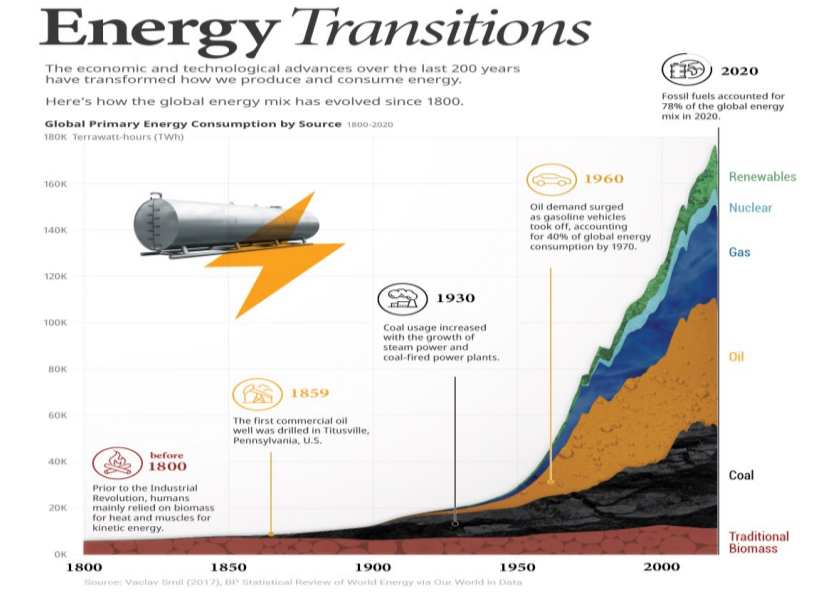



***Figure 1.*** *History of global energy transition 1800-2020*

[11] Sovacool, B. K. (2016). How long will it take? Conceptualizing the temporal dynamics of energy transitions. *Energy Research & Social Science*, *13*, 202-215.
[12] Araújo, K. (2014). The emerging field of energy transitions: Progress, challenges, and opportunities. *Energy Research & Social Science*, *1*, 112-121.
[13] Fouquet, R., & Pearson, P. J. (2012). Past and prospective energy transitions: Insights from history. *Energy policy*, *50*, 1-7.

The ETI is a composite index that focuses on tracking specific indicators to measure the energy system performance and transition readiness of world countries. At its core are two equally weighted sub-indexes: ***the system performance score and the transition readiness* score**.

**1. System performance score:** This is calculated with *specific indicators,* which are defined using the three imperatives of the energy system (energy triangle): *economic development and growth, environmental sustainability, and security and access***.** Among the three dimensions of the triangle, environmental sustainability poses the biggest challenges.

**2. Transition readiness score**: This is calculated using indicators, which define six enabling dimensions: *capital and investment, regulation and political commitment, institutions and governance, infrastructure and innovative business environment, human capital, consumer participation, and energy system structure.*

Scores (on a scale of 0-100%; with 100% being the target value) and associated rankings are calculated for each of the indicators, creating the system performance and transition readiness scores, using various well-established statistical methods. These numbers are then aggregated to calculate a score and ranking for each of the *three dimensions of the triangle (system performance) and the six enabling elements (transition readiness).* The aggregation of system performance and transition readiness results in the overall ETI score and ranking.

The Energy Transition Index (ETI) framework was developed by the World Economic Forum (see Figure 2) with the ambitious aim of comprehensively monitoring the global energy transition. *The heart of the Index is an analytic framework that measures transition as a shift towards an energy system that supports sustainability, security, and access, and towards institutions that enable this performance*. The ETI provides a data-driven framework to foster an understanding of the performance and readiness of energy systems across countries for transition.

This poses two key questions for decision-makers: what is required for an accelerated improvement in countries' energy systems and how can the right conditions be put in place that will allow these systems to seize the opportunities from this energy transition? No stakeholder in the energy system can drive such improvement alone. Many actors in businesses, government, and society will need to come together, bringing their different viewpoints, priorities, and sentiments. To facilitate effective dialogue between those parties, a common fact base and understanding of the challenges are required. Moreover, the World Economic Forum (2018)[14] has developed a comprehensive proxy for the Energy Transition Index (ETI), which includes two major sub-indices: *the energy System Performance Index and Transition Readiness.* The first sub-index assesses the current state of the energy system, while the second forecasts future transition (s). Any factor that can push these two levers in the right direction will eventually result in better energy transitions.

The Energy Transition Index (ETI), links the performance of countries' energy systems today with their readiness for the future. This new index highlights countries' comparative strengths and

[14] World Economic Forum (2018), Fostering Effective Energy Transition: A Fact-Based Framework to Support Decision-Making, available at: https://www3.weforum.org/docs/WEF_Fostering_Effective_Energy_Transition_report_2018.pdf

improvement areas and allows private stakeholders to compare countries' relative system performance and transition readiness to identify opportunities and threats to their business.
The ETI framework is composed of two equally weighted sub-indices (please see Fig. 2): *the current energy system performance and the enabling environment for the energy transition*. An effective energy transition can be defined as a timely transition towards a more inclusive, sustainable, affordable and secure energy system that provides solutions to global energy-related challenges, while creating value for business and society, without compromising the balance of the energy triangle.

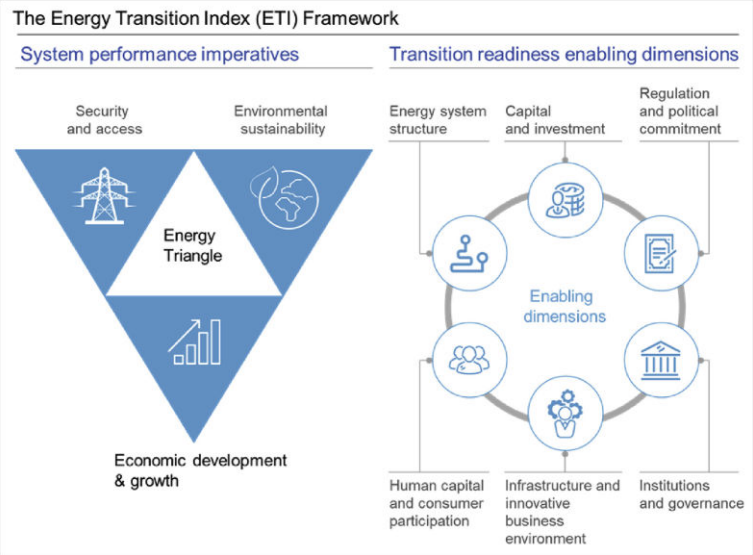



***Figure 2.*** *Source: World Economic Forum, Fostering Effective Energy Transition: A Fact-Based Framework to Support Decision-Making, 2018*

As can be seen illustratively in figure 2 above the short description is given: The **Energy Transition Index (ETI)** allows the assessment of world countries' energy systems within this framework, by providing benchmarks across:

1. **System performance**: These measures *current performance*, based on the delivery of the energy system on the imperatives of the energy triangle, namely promoting an energy system that supports inclusive economic development and growth, secure and reliable access to energy, and environmental sustainability. *For more details please see table 1 below.*

***Table 1.*** *System performance score indicators*

| Imperative | Measure (of) | Indicator name | Weighting | Status of indicator in Kosovo |
|---|---|---|---|---|
| **Economic development and growth** | *Affordability* | Household electricity prices (PPP $c/kWh) | 0.20 | From ENCT countries the lowest electricity prices were in Kosovo (6.07 cents EUR/kWh). |
| | *Cost competitiveness* | Industry electricity prices ($c/kWh) | 0.10 | Electricity tariffs are set at 7€cts/KWh |

| | | | | |
|---|---|---|---|---|
| | | | | (6.1€cts/KWh for households and 8.4€cts/KWh for non-households), reflecting a coal-based generation price of 2.95 €cts/KWh, a renewable generation price of 9€cts/KWh, and a price for<br><br>electricity imports of 18.6€cts/KWh. |
| | | Wholesale gas price ($/MMBtu) | 0.10 | N/A |
| | *Cost-reflective prices* | Fossil fuel subsidies (% of GDP) | 0.2 | 1.22 EUR/MWH |
| | *Externalities* | Unpriced cost of externalities (% of GDP) | 0.20 | N/A |
| | *Supports/detracts from growth* | Value of energy exports (% of GDP) | 0.10 | N/A |
| | | Cost of energy imports (% of GDP) | 0.10 | N/A |
| **Environmental sustainability** | *Air Pollution* | PM2.5 (µg/m3 ) | 0.25 | 24.80<br><br>The ambient concentrations of PM2.5 in Kosovo exceed the World Health Organization air quality guideline value of 10 µg/m3 and the EU limit value of 25 µg/m3 |
| | *Energy intensity* | Energy intensity (MJ/$2011 PPP GDP) | 0.25 | N/A |
| | *Carbon intensity* | $CO_2$ intensity (kg/GJ TPES) | 0.25 | *0.4707<br><br>The annual emissions of greenhouse gases in Kosovo for 2019 are estimated.<br>at about 9613 Gg (Giga grams) $CO_2$ eq, |

| | | | | |
|---|---|---|---|---|
| | | | | (equivalent) or about 9.6 million tons of $CO_2$eq4. Kosovo's carbon intensity, as measured by $CO_2$ emissions per unit of output, is the highest in the western Balkans and about four times the average of the EU. |
| | *Carbon emissions per capita* | $CO_2$ emissions per capita (tonnes/capita) | 0.25 | Compared to other countries in the EU average (9.93 t) Kosovo has relatively low emissions per capita (**5.7 t $CO_2$ equivalent per capita** (2008), while greenhouse gas emissions per unit of GDP (0.84 kg $CO_2$ equivalent per EUR during the year 2008) are higher. |
| **Energy access and security** | *Energy access* | Electrification rate (% of the population) | 0.17 | Access to electricity (% of the population) in Kosovo was reported at 100 % in 2019, according to the World Bank collection of development indicators, compiled from officially recognized sources. |
| | | Solid fuels use (% of the population) | 0.17 | N/A |
| | *Supply security* | Energy imports (% of energy use) | 0.11 | 15% |
| | | Import counterpart diversification (HHI) | 0.11 | N/A |

| | | | | |
|---|---|---|---|---|
| | | Diversity of TPES (HHI) | 0.11 | The total primary energy supply in Kosovo 94 from coal and diversification is approximately 6 % |
| | *Supply quality* | Quality of electricity supply (Index) | 0.33 | N/A |

***Source:*** *World Economic Forum - ETI 2018*

**Transition readiness:** This measures the *future preparedness* of countries' systems. Transition readiness is defined using *six dimensions*, which support effective and timely progress in system performance. They are the availability of investment and capital, effective regulation and political commitment, stable institutions, and governance, supportive infrastructure and an innovative business environment, human capital, and the ability of the current energy system to accommodate change. *For more details, please see table 2 below.*

***Table 2.*** *Transition readiness score indicators*

| Enabler dimension | Measure (of) | Indicator name | Weighting |
|---|---|---|---|
| **1. Capital and investment** | *Ability to invest* | Investment Freedom (Index) | 0.25 |
| | *Capital availability* | Access to Credit (Index) | 0.25 |
| | *Investment* | Investment in energy efficiency (% of total) | 0.25 |
| | | Renewable capacity buildout (% of total) | 0.25 |
| **2. Regulation and policy** | *Commitment to international contracts* | Commitment to COP21 NDCs91 (Index) | 0.33 |
| | *Policy stability* | Stability of Policy (Index) | 0.33 |
| | *Regulatory support* | Sustainable Energy (Index) | 0.33 |
| **3. Stable institutions** | *Transparency* | Corruption Perception (Index) | 0.17 |
| | *Rule of law* | Rule of Law (Index) | 0.33 |
| | *Credit rating* | Credit Rating (Index) | 0.33 |
| **4. Infrastructure and innovative business environment** | *Trade Logistics* | Performance (Index) | 0.25 |
| | *Transportation Quality of* | Transportation Infrastructure (Index) | 0.25 |
| | *Technology* | Availability of Technology (Index) | 0.25 |
| | *Business environment* | Innovative Business Environment (Index) | 0.25 |
| **5. Human capital and consumer participation** | *Workforce impact* | Jobs in low-carbon industries (%) | 0.50 |
| | *Qualifications* | Quality of Education (Index) | 0.50 |
| | *Maturity of the energy system* | Energy per capita (GJ/capita) | 0.33 |

| | | | |
|---|---|---|---|
| **6. Energy system structure** | *Power generation mix* | Share of electricity from renewable generation (%) | 0.11 |
| | | Share of electricity from coal generation (%) | 0.11 |
| | | Flexible electricity supply (%) | 0.11 |
| | *Fossil fuel dependency* | Fossil fuel reserves ($CO_2$ emissions, billion Mt) | 0.33 |

***Source**: World Economic Forum - ETI 2018*[15]

## 4. SYSTEM PERFORMANCE AND TRANSITION READINESS

A future energy mix dominated by low-carbon energy systems such as solar, wind, hydrogen, and biomass is more likely to have a national or regional footprint, implying that energy security and sustainability may be able to coexist. Countries that shift to more decarbonized domestic energy sources are likely to become more self-sufficient and less reliant on global energy trade, especially if combined with efficiency measures that reduce overall energy needs. World ETI scores for the past ten years period 2012 – 2022 are shown in the figure below with an increase of 2.3 %.

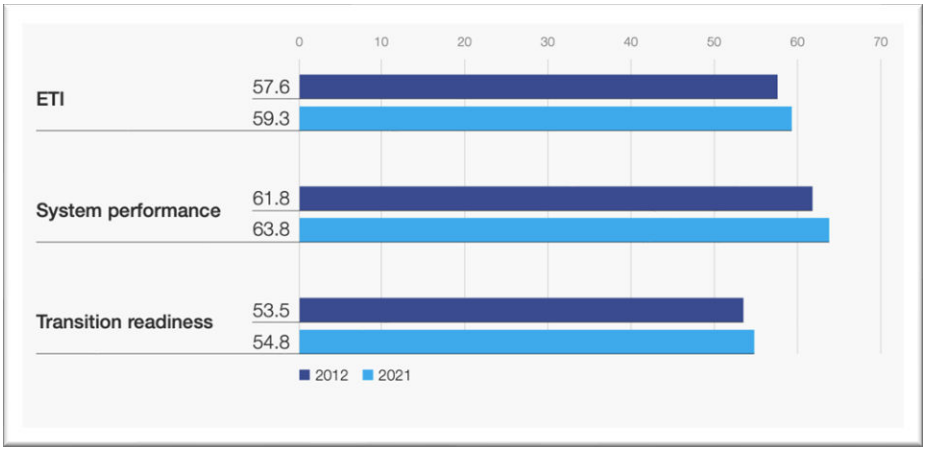



***Figure 3.** Global ETI scores*[16]

Countries of northern Europe like the Netherlands, Denmark, and Scandinavian countries have the highest ETI index in the World.

[15] World Economic Forum (2018), Fostering Effective Energy Transition: A Fact-Based Framework to Support Decision-Making, available at: https://www3.weforum.org/docs/WEF_Fostering_Effective_Energy_Transition_report_2018.pdf

[16] World Economic Forum (2022). Fostering Effective Energy Transition 2022 Edition, available at: https://www3.weforum.org/docs/WEF_Energy_Transition_Index_2022.pdf

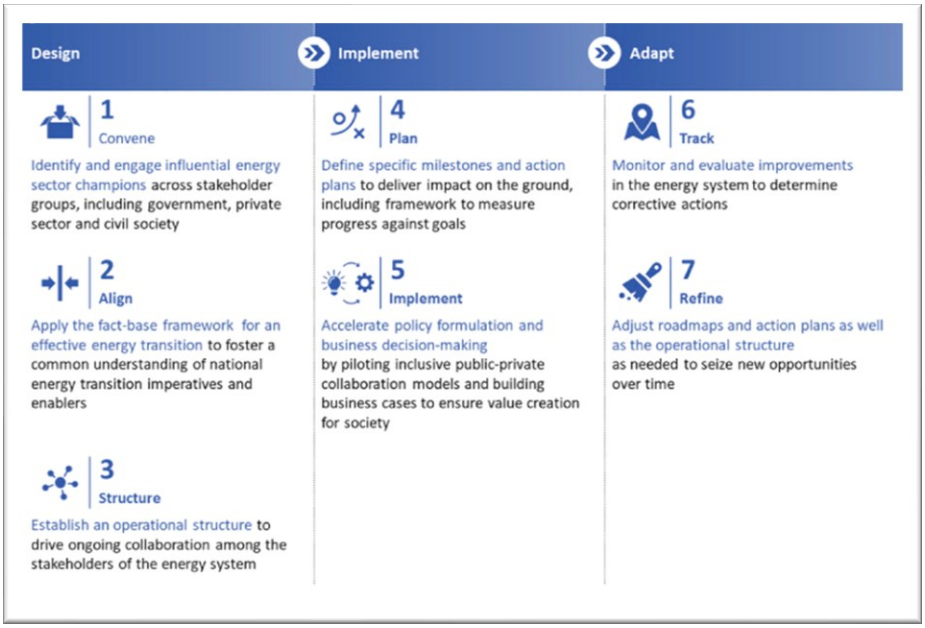



***Figure 4.*** *Seven (7) steps to plan and adopt the road map to the energy transition*

The components of achieving near-zero emission are:[17]

1. '*Green transition in agriculture and the environment'* aims to reduce GHG emissions in the agricultural sector. Reforms and investments under this component support conversion to organic agriculture, rewetting of drained land, soil pollution clean-ups, and research.
2. '*Energy efficiency, green heating, and carbon capture and storage'* aims to help achieve the climate targets, while bringing energy costs down. This includes conversion from coal, wood burners, and gas furnaces to electric heat pumps, district heating, and energy renovations of buildings. The investments in energy-efficient solutions and carbon capture storage potential aim to help achieve Kosovo and Green Agenda and ECT climate targets, while creating jobs and boosting the economy.
3. '*Green tax reform'* follows a two-phase approach that aims, firstly, for ambitious GHG tax reform, creating emission reduction incentives for the most affected companies, to accelerate a just and green transformation. The second phase will deliver a uniform carbon tax to ensure emissions reductions across all sectors.
4. '*Sustainable Road transport'* seeks to reduce GHG emissions in the transport sector, especially road transport, which accounts for 90 % of the sector's emissions. The component focuses on tax incentives to aid the transition towards zero-emission cars, and awareness raising to influence consumers' transport choices, supported by investment in bicycle, e-bike, and e-car infrastructure.
5. '*Digitalisation*' includes a new digital strategy to promote digital transformation across the public and private sectors, and to strengthen welfare, equality, growth, employment, and the green transition.

[17] Harsh Vijay Singh et al. (2019). The energy transitions index: An analytic framework for understanding the evolving global energy system, Energy Strategy Reviews, Volume 26.

6. '*Green research and development'* aims to create long-term growth and jobs while enhancing the twin green and digital transitions by boosting research in green technologies.

### a) System performance in Kosovo

Since Kosovo is not yet member of the UN, it is not a direct signatory of the conventions and other international environmental agreements. Kosovo has not participated in or signed the UN Framework Convention on Climate Change (UNFCCC) but it has the responsibility to respond to the requirements as one of the signatories of the Energy Community Treaty[18]. In this context, the Government plans investments for sustainable development and integrated infrastructure as well as activities to improve the air and natural resources by updating the legal and strategic framework (Kosovo environmental strategy). The Climate Change Strategy 2018-2027[19] with its action plan, addresses two components, low-emission development, and adaption to climate change effects.

In Kosovo's energy sector, coal plays a major role. Its share in electricity production continued to exceed 90%. Record-breaking gas prices have reversed the trend of generating energy from this fuel across Europe. Despite the rapidly growing costs of $CO_2$ emissions, most of the time Kosovo's electricity market was one of the cheapest in the EU. Electricity production amounted to more than 179 TWh, which is the highest in history.

During summertime, Kosovo assisted its neighbors more intensively in meeting their electricity demand, and net imports to Kosovo were the lowest in five years at 0.89 TWh. However, these developments resulted in higher $CO_2$ emissions. Today, the energy sector in Kosovo accounts for 86% of greenhouse gas emissions, and it holds the key to mitigating the worst effects of climate change. Reducing global carbon dioxide ($CO_2$) emissions to net zero by 2050 is consistent with efforts to limit long-term average global temperature increases to 1.5°C. This calls for nothing less than a complete transformation of how we produce, transport, and consume energy. However, a huge amount of work is needed to turn today's impressive ambitions into reality, especially given the range of different situations among countries and their different capacities to make the necessary changes.

Kosovo lacks a consistent GHG monitoring, reporting, and verification mechanism, and liberalization of its energy markets remains incomplete. Subsidies for coal and low excise taxes on fuels (particularly diesel) remain challenges. Institutional, financial, and technical obstacles to renewable energy development persist, and Kosovo does not yet have appropriate incentives (particularly for vulnerable consumers) and enabling conditions for energy efficiency improvements in buildings. A shortage in important skills for scaling up renewable energies and energy efficiency improvements was also noted.

Coal-fired power generation is a major driver for high $CO_2$ and PM2.5 emissions. Kosovo with a high share of coal in its primary energy supply mix is expected to face challenges in sustainably improving its energy system performance. Although each country's energy transition pathway is different, they all share common attributes including low levels of fossil fuel subsidies, enhanced energy security from a diversity of fuel mix and import partners, improved carbon intensity,

[18] Energy Community Treaty (2005). Available at: https://www.energy-community.org/legal/treaty.html

[19] Government of Kosovo (2019). Climate Change Strategy and Action Plan 2019-2028, available at: http://kepweb.org/documents_custom/climate-change-strategy-and-action-plan-2019-2028/

reduced dependence on fossil fuels in the energy mix, and a strong regulatory environment to drive the energy transition.

### b) Transition readiness in Kosovo

Readiness for energy transition is determined by factors including stability of the policy environment and level of political commitment, investment climate and access to capital, level of consumer engagement, and development and adoption of new technologies. For the purpose of our framework, "transition readiness" refers to the degree to which a country's energy system has the political, economic, and social structures in place to allow a transition to a more secure, reliable, inclusive, and sustainable energy system that fosters greater economic development. Related to energy exploitation but referring to environmental, social, and economic domains, such as improvement in local energy security, people's opinion on different energy solutions, economic co-benefits for private users, environmental externalities, and so on. Transition readiness is defined using *six dimensions*, which support effective and timely progress in system performance.
Since transition readiness is multi-dimensional, countries need to establish favorable conditions in all six readiness dimensions to fully capture the opportunities from the energy transition. The removal of fossil fuel subsidies and the reduction of energy intensity are important improvement levers as they showed synergistic impact on other dimensions of the energy triangle. An effective energy transition also relies upon a working market design, investment attractiveness, multilateral partnerships, and the presence of a dynamic environment of innovation. Above all, the energy transition has societal implications, and, in the end, consumer behavior will determine the acceptance of future energy systems.

The IEA indicates that "energy efficiency improvement will drive more than 40% of the reduction of energy-related GHG emissions over the next 20 years".[20] Energy consumption per capita is a strong indicator of a country's economic growth[21], and a key determinant of the quality of life enjoyed by its citizens.[22] The energy transition towards decarbonization in Kosovo will have to address three policy problems: ***phasing out coal, transforming affected industries, and ensuring socio-economic recovery.*** Currently, Kosovo is in lack of capital to finance the energy transition. Thus, to ensure a smooth energy transition, Kosovo must now tackle a set of important challenges that remain. Kosovo's three overarching areas for improvement: *energy and climate policies could be given higher priority; existing legislation could be better enforced; and implementation of strategic documents could be significantly strengthened.* Additionally, the private sector, civil society, and academia are not yet sufficiently included in energy and climate policymaking. However, capital investments in mature renewable energy technologies account for most of this investment, while other energy transition areas such as mobility, electrified heat, storage, and carbon capture and storage (CCS) account for a small proportion of the total investment. The energy transition will not come without costs. *Carbon taxes, removal of fossil fuel subsidies, and levies on electricity bills could all add to the cost of electricity*

[20] Whiting, Kate, (2022). "Energy efficiency is the world's 'first fuel' - and the main route to net zero, says IEA chief", World Economic Forum, Agenda, https://www.weforum.org/agenda/2022/01/iea-energy-efficiency-worldsfirst-fuel-net-zero.
[21] Stern, D., & Cleveland, C. J. (2004). Energy and Economic Growth (Rensselaer Working Papers in Economics). *Rensselaer Polytechnic Institute, Department of Economics*.
[22] Martinez, D. M., & Ebenhack, B. W. (2008). Understanding the role of energy consumption in human development through the use of saturation phenomena. *Energy Policy*, *36*(4), 1430-1435.

*and fuels, leading to affordability challenges for some*. Significant infrastructure investments will be required.
Kosovo remains committed to diversifying its generation portfolio in an effort to achieve an increased share of RE in its final energy consumption that is in line with EnCT obligations, the Washington Agreement, and Sofia Agreement endorsing the Green Agenda for the Western Balkans. These commitments will require the mobilization of hundreds of millions of dollars in private sector investment based on competitive and transparent processes, continued reform within legal and regulatory RE frameworks, and the strengthening and modernization of the electrical grid to accommodate large intermittent generation capacities and better integration of prosumers.

This dimension also includes projections or scenarios for the development of electricity sources. Based on the Energy Strategy 2022-2031, the two units of TP Kosova B will undergo general revitalization, enabling their operation with optimal technical parameters both in terms of capacity and in meeting the emission level according to European standards. Also, two units of TP Kosova A are expected to be revitalized in compliance with European standards and as such will operate as a strategic reserve during periods of time when the demand is very high (3 months a year). On the other hand, the main orientations of the Energy Strategy are in the direction of decarbonization of the energy sector, where renewable sources from the wind and the sun as well as energy efficiency will be the main pillars of decarbonization.

The process of transitioning from fossil resources is expected to be gradual and long-term (2030-2050), but this type of resource will be the main pillar of security of supply for Kosovo for a long period of time. Fossil energy sources will be gradually replaced with renewable sources, accompanied by the development of flexible units, and energy storage facilities which will be necessary to enable the integration of RES into the system. In the next ten years, the gradual increase of RES capacities is planned with the aim that by 2031 the capacity of new sources from the wind will be increased by 600 MW (738 MW with the existing capacities) and also 700 MW from the sun, of which 100 MW is expected to be of the "self-consumption" category.

The integration of these capacities from variable resources requires proper planning of the transmission network as well as the provision of flexible resources to achieve real-time system balancing. In this context, until 2027, about 170 MW Accumulator Batteries are expected to be installed with a duration of two hours within the framework of support from the United States of America through the Compact project from MCC. The batteries will enable the balancing of the system and the integration of RES in the electricity system of Kosovo. They will provide secondary (aFRR) and tertiary (mFRR) regulation to the System Operator. They will also be used to shift the peak through the optimal charging and emptying process.

All the indices mentioned will track specific parts of the energy transition, such as sustainability, access, energy security, etc. To increase energy savings to increase renewable energy production; To increase the capabilities of public authorities on energy supply and production management. Kosovo faces the dual challenge of needing to reduce its high carbon and energy intensities while also stimulating economic development.

***Table 3.*** *Kosovo energy transition readiness description*

| | |
|---|---|
| **Regulation and Political Commitment** | Kosovo participates and works towards the commitment to the ENCT, Sofia Declaration; Western Balkan Green Agenda, and SDGs. |
| | Political stability – a majority government |
| | Regulatory indicators for sustainable energy on energy efficiency |
| | Regulatory indicators for sustainable energy on renewable energy |
| | Regulatory indicators for sustainable energy on energy access |
| **Institutions and Governance** | Rule of Law[23], Kosovo stands at 57 out of 140 countries with an overall score of 0.56. Which is very high compared to other countries in the region. |
| | Transparency and corruption index, Kosovo[24] stands at 87/180 countries. |
| | Country credit ratings- Kosovo stands at BBB[25] which means Lower Medium grade. |
| **Energy Stakeholders (private sector)** | NGO-energy and environmental<br>Civil society-Just transition<br>Private banks on green loans etc. |

The ways in which people across the world produce, consume, and trade energy are changing. New roles are emerging, including the energy '*prosumer*', a consumer who is also involved in production (for example, generating electricity from solar panels to sell back to the grid). In Kosovo, any electricity customer connected to the low voltage distribution network with an installed capacity of less than 100kW can apply to their supplier for the status of self-consumer under the current net billing scheme. This incentive has already connected 128 self-consumers, and many new applications are in the works. The proposed target for prosumers in the draft Energy Strategy is 10MW by 2025 and 100MW by 2031.

Immediate removal of all administrative barriers and provision of limited support for small-scale solar PV deployment appears to be a step that requires little more than political will. Let the sunshine on the homes of citizens mark the first step in the Kosovo energy transition. Implementing the energy transition from fossil-based systems of energy production and consumption to renewable energy sources is complex, involving not only radical technological changes but also deep socioeconomic and political structural changes.

Kosovo must achieve full decarbonization by 2050 if it is to join the EU. Kosovo confirmed this intention when it signed the Sofia Declaration in November 2020, which included a pledge to adopt the EU's Climate Law. However, achieving carbon neutrality by 2050 will require drastically reducing the use of fossil fuels in transportation and electricity generation and offsetting any remaining emissions through carbon capture and storage or planting forests.

[23] https://worldjusticeproject.org/rule-of-law-index/country/2022/Kosovo
[24] https://www.transparency.org/en/cpi/2021/index/ksv
[25] https://www.wikirating.com/kosovo/

## 5. How to Achieve Net Zero Emission in 2050

Achieving net-zero emission by 205, however, requires the government to promote the rapid deployment of renewable energy (primarily solar power and wind), boosting investment in green technologies such as electricity storage systems, and CCS. The transition to net zero is for and about people. It is paramount to remain aware that not every worker in the fossil fuel industry can ease into a clean energy job, so the government needs to promote training and devote resources to facilitating new opportunities. Citizens must be active participants in the entire process, making them feel part of the transition and not simply subject to it. According to the International Renewable Energy Agency, renewable energy and energy efficiency measures can potentially achieve 90 percent of the required carbon reductions.[26] Regarding the political commitment that Kosovo, along with the other Western Balkan 6 countries made in 2020 by signing the Sofa Declaration on Green Agenda for the Western Balkans.

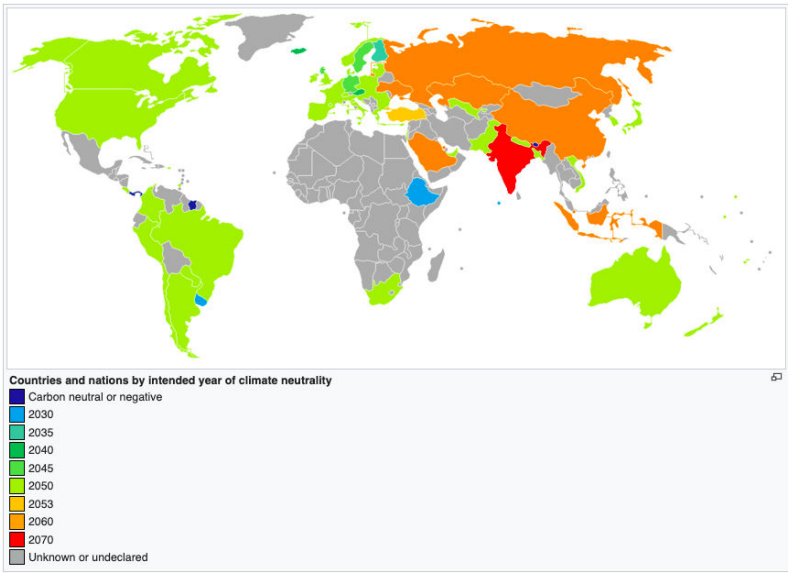



***Figure 5.*** *World countries intended year of climate neutrality*[27]

As can be seen in figure 5 above most of the world's countries intend to become climate neutral in 2050, Russia and China in 2060 and India in 2070. Whereas globally there are already three (3) countries carbon negative (Bhutan, Suriname, and Panama)[28]. However, African countries have not declared or/are unknown data on their commitments toward climate neutrality. Likewise, with most of the Western Balkan six including Kosovo. In comparison, the solar power sector is relatively new to Kosovo and began to develop only 1–2 decades ago but is steadily expanding in both Kosovo and around the world. Deploying solar power on a large scale would require addressing the challenge of its intermittency, with which various technological and market-based

[26] IRENA (2021). Fast-Track Energy Transitions to Win the Race to Zero available at: https://www.irena.org/news/pressreleases/2021/mar/fast-track-energy-transitions--to-win-the-race-to-zero

[27] Countries net zero climate goals, available at: https://www.climatechangenews.com/2019/06/14/countries-net-zero-climate-goal/.

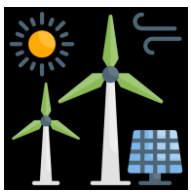
[28] Reuters (2021). Forget net-zero: meet the small-nation, carbon-negative club Available at: https://www.reuters.com/business/cop/forget-net-zero-meet-small-nation-carbon-negative-club-2021-11-03/

solutions are now being experimented. First, all zero-emission scenarios feature a complete coal power phase-out. The achievement of zero emissions by 2050 requires that no new coal power plants are built, with none of the existing ones serving more than the year 2040. For a more ambitious goal of achieving zero emissions by 2050, coal power should be retired even earlier. Such retirement is in line with ENCT carbon neutrality by 2050. Kosovo would need to follow in the footsteps of the pioneers of coal retirement such as the UK[29] and most likely deal with significant adjustments in the coal sector. Secondly, all zero-emission scenarios envision the rapid growth of renewable electricity, primarily solar and wind power. The ramp-up would imply continuing the existing rapid trends of solar power deployment, initiating an equally rapid deployment of wind, and taking the electricity system into new territory featuring high penetration of intermittent renewables. Such aspirations, at least in the near term, are in line with the new energy strategy and track records of international leaders in renewable power.

The strategy also stipulates three implementation details about the gradual phase-out of coal, connecting with neighboring countries with natural gas and heavily transitioning to renewable energy sources. First, existing coal-fired units will be either retrofitted into cleaner natural gas units or pushed into early retirement. Second, existing coal-fired units will be operated at a lower utilization rate. A third, renewable capacity will be increased from 200MW in 2021 to 1.4GW in 2031, raising the share of renewable electricity to 32 % by 2031. These specific plant-level targets for coal phase-out and renewables expansion provide a scenario assumption to make the results more realistic and sensible toward net zero in 2050. To achieve a smooth energy transition and $CO_2$ emission reduction targets, the concept of a post-carbon Kosovo, which focuses on low-energy and low-emission buildings equipped with intelligent heating and cooling systems, electric and hybrid cars, and improved public transportation, has to be promoted.

In the fight against climate change and increasing resilience, the energy sector remains the most important sector that can be transformed through the accelerated adoption of renewable energy sources. The energy sector in Kosovo currently contributes more than 86% of total global greenhouse gas emissions, and significant efforts are needed to reduce the sector's carbon footprint and achieve mid-century carbon neutrality. The growing demand for affordable and safe energy on a global scale is moving humanity towards wider use of low-carbon energy, but also towards ensuring a competitive economy and quality environmental protection. Thus, Kosovo needs to conduct the following steps:

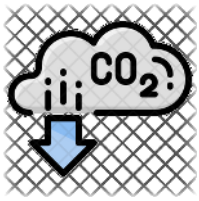
- **No new coal plants** to be built and decommissioning of the existing coal plants is a must for the net-zero 2050. Existing TPP to connect with CCS.



- **Renewable power boost** is a major lever to reduce carbon emissions and air pollution. The increased renewable target of 31% by 2025 and 40% by 2035,

[29] UK transition from coal to biomass (2020). Available at: https://reports.electricinsights.co.uk/q1-2021/britains-transition-from-coal-to-biomass-to-beccs/

As an example, and as an alternative to private energy management, renewable cooperatives[30] could be an opportunity to start a transition towards a democratic and sustainable energy system.




**Decarbonization** promotional awareness campaign

- The role of citizens and local authorities in the transition towards a net-zero GHG economy is not only about technology and jobs, but also people and their lives – how they use transport, live and work together.
- Consumers have a powerful role to play in driving the transformation forward. An individual's choice impacts their carbon footprint, whether it be buying a house, choosing a diet, or purchasing a car. Lifestyle choices can make a real difference in the transition to climate neutrality while improving quality of life.

Table 4 below are the measures for the year 2023 to the road map in achieving net zero emissions by 2050.

***Table 4.*** *Road to net zero emission 2050 -* ***Measures for the year 2023.***

| Measure for the year 2023 | Type of measure | Status | | |
|---|---|---|---|---|
| | | Completed | Partially | No progress |
| Adoption of the Law on RES | Regulatory | | x | |
| Draft by-laws from the adopted RES law | Regulatory | | | x |
| Introduce the First solar auction – sliding premium | Regulatory | | | x |
| Adoption of the first climate change Law | Regulatory | | x | |
| Access to finance on EE | Financial support | | x | |
| More funds allocated to the Kosovo energy efficiency fund | Financial support | | x | |
| Implement existing energy efficiency policies and legislation | Regulatory | | x | |
| Adopt new law on energy performance in building | Regulatory | | x | |
| Build up the skills needed for scaling up RES | Capacity building | | x | |
| Adoption of the National Plan for Energy and Climate | Strategic | | x | |
| Establish greenhouse gas emissions reduction targets | Soft | | | x |
| GHG reporting system in place | Soft | | x | |
| Prepare the program for the protection of vulnerable consumers and prepare a plan and mitigation measures to support these consumers. | Strategic | | x | |
| Develop and organize - Promoting consumer participation (*awareness of climate change and carbon* | Soft measure | | x | |

[30] Renewable cooperatives, available at: https://socialres.eu/news/sharing-power-to-foster-renewables-the-cooperatives-model/

| | | | | |
|---|---|---|---|---|
| *footprints, individual responsibility for action, incentives for consumer behavioral change*) | | | | |
| Start gradually applying the Emissions Trading Scheme | Regulatory | | | x |
| Energy Efficiency Law requires the adoption of remaining by-laws | Regulatory | | | x |
| Establishing energy service companies (ESCOs) to finance energy efficiency services | Institutional | | x | |
| Review and adopt the Rule on Certificates of the Origin | Regulatory | | x | |
| Establish a national and regional renewable energy certification system | Regulatory | | | x |
| Introduce circular economy measures to reduce waste | Soft measure | | x | |
| Adopt the Energy Strategy 2022-2031 | Regulatory | | x | |
| Increase the number of prosumers (solar) | Financial support | | x | |
| Participation in the ALPEX energy exchange, in the intraday market, and the day-ahead | Regulatory | | x | |
| Adopt and implement the AI on biofuels | Regulatory | | | x |
| Implemented the climate neutrality commitment in its national legislation | Regulatory | | | x |
| Draft a long-term decarbonization strategy | Strategic | | x | |

***Source:*** *INDEP elaboration*

Power sector market design:

The forced unbundling of the power sector to create transparency and promote efficiency in the grid and generation businesses, the opening of power generation (and retail markets) to competition, and auctions for new capacity in conventional and renewable energy are becoming the new normal.

– Shorter (e.g.,15 minute) intraday auctions (as introduced by Germany in 2015) can better match the production of intermittent renewable generation, and in particular the ramp-up and ramp-down of solar generation.

– Different sources of flexibility (distributed generation, including microgrids and mini-grids, batteries, and demand side management) should be allowed to compete in the market for offering ancillary services (as is already happening in the United Kingdom), by removing current regulatory barriers.

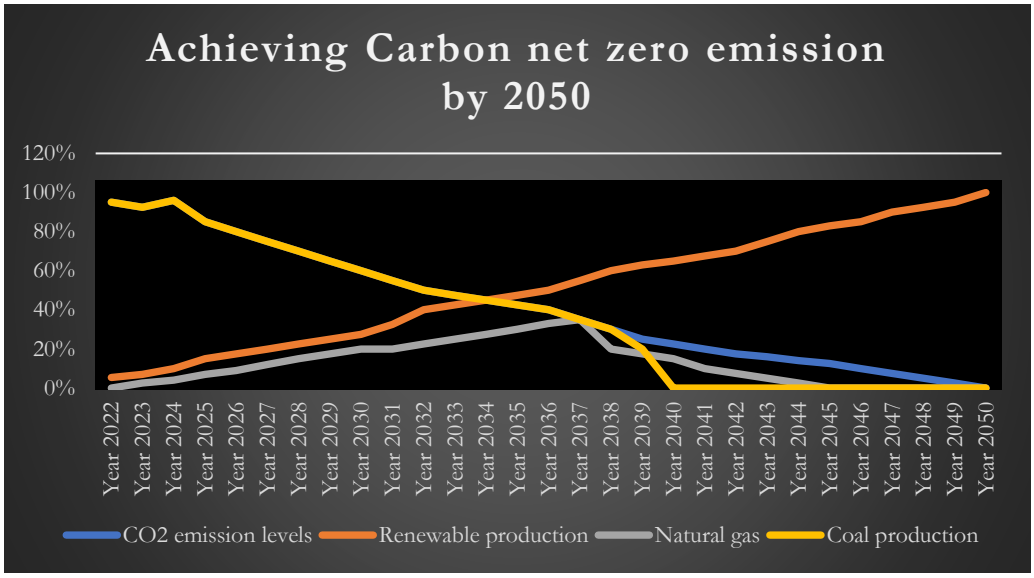



***Chart 1. The indicative chart in achieving Carbon Net Zero by 2050***
***Source:*** *INDEP elaboration*

In the scenarios reaching at least 50% emission reduction by 2032 that are analyzed in this paper, the energy transition is characterized by:

- A reduction of total coal consumption by at least 50% in the next 10 years.
- An increase of the installed capacity of variable renewables by 1.4 GWM.
- Differences in energy efficiency (19% to 32% range) and the share of energy from renewables (24% to 40% range).
- The following factors influence that range:
- To the growth of renewables in gross final energy consumption, which varies from 200 MW to 1.4 GW.
- The reduction of energy demand for heating buildings and transportation;
- The rapid electrification of transport that reduces oil and requires proportionally smaller amounts of renewables to satisfy the same demand.
- The scenario context on coal and gas with the availability of CCS.

For Kosovo to achieve its target, electricity production would need to quadruple than double, by 2050 largely from clean sources, and achieve net zero. This growth would be driven by a massive ramp-up of renewable electricity generation over the next 30 years, including a many-fold increase in solar and wind. To replace coal-fired power generation, natural gas needs to be introduced and imported to double. Fossil fuels, coal, and gas would still account for 10-20% of the energy consumed, so would need to be paired with carbon capture and storage CCS or offset by new forest growth and technologies that can suck $CO_2$ directly out of the atmosphere. But shifting Kosovo's economy away from its dependence on fossil fuels in such a short time will be very expensive, says that a major cost will be the energy storage required to integrate wind and solar at such a scale. The importance of developing socially responsible transition programs to redeploy staff and stimulate new job opportunities in low-carbon technologies and services should be emphasized.

***Table 5.*** *Prioritized technology to be financed, with an expected contribution to Kosovo becoming net zero by 2050*

| Industry | Technology breakthroughs | | Expected contribution to 2050 net zero in Kosovo |
|---|---|---|---|
| **Energy** | Photovoltaic | Generating electricity from solar power with PV modules | 35% |
| | Wind | Generating power with wind turbines | 25% |
| **Construction** | Green cement | Using waste or green materials and more efficient technologies in cement production | 5% |
| | Building energy management | Efficient in-building energy management and use of the building in renewable energy production (e.g. rooftop PV) | 10% |
| **Mobility** | Electrification of automobiles | Using electric vehicles to replace fuel vehicles | 5% |
| **Heating** | Green heating | Using geothermal, industrial waste heat, and other energy sources to replace coal for heating | 5% |
| **General** | Carbon capture, utilization, and storage | | 15% |

***Source:*** *INDEP elaborate*

Renewable energy is at the core of tackling GHG emissions and transitioning to a sustainable energy system. However, history shows that simply adding generation capacity is not enough to facilitate an energy transition. Coal required mines, canals, and railroads; oil required wells, pipelines, and refineries; electricity required generators and an intricate grid. Similarly, a complete shift to low-carbon sources requires massive investments in natural resources, infrastructure, and grid storage, along with changes in our energy consumption habits. Another significant specific goal is to promote prosumers, whose deployment will be encouraged by improved legal and regulatory framework and administrative procedures, as well as the introduction of various support schemes. In addition to boosting the share of RES in final electricity consumption, this will help to reduce distribution network losses.

***Table 6.*** *The main indicators and targets for RES capacities till 2031*

| Indicator | Baseline | Target for 2025 | Target for 2031 |
|---|---|---|---|
| RES capacity in the electricity sector (excluding prosumers) | 244 MW [2021] | 490 MW | 1400 MW |
| Prosumer capacity | 2 MW [2021] | 10 MW | 100 MW |

*Source: Kosovo Energy Strategy 2021-2031*[31]

[31] Government of Kosovo. Energy Strategy 2022-2031, available at: https://konsultimet.rks-gov.net/viewConsult.php?ConsultationID=41426

***Table 7.*** *GHG reduction target till 2031*

| Indicator | Baseline | Target for 2024 | Target for 2031 |
|---|---|---|---|
| GHG reduction in the power sector compared to 2019 | 0% [2019] (6316 kt CO2) | 0% | -32% |
| Renewable share in the electricity sector consumption (RES-E share) | 6.3% [2021 ] | 13% | 35% |

***Source:*** *Kosovo Energy Strategy 2022-2031*

Although Kosovo is not yet a participant in the ETS scheme, the ETS price will be one of the most influential factors in the mid-and longer-term energy market developments within the country. In the mid-term, the ETS price will influence import prices. Over the long term, Kosovo is committed to introducing a carbon pricing system and harmonizing it with the EU ETS price levels by 2030, by virtue of having signed the Sofia Declaration on the Green Agenda for the Western Balkans.

According to the recently adopted energy strategy, a national emission trading scheme (ETS) will be introduced, with a gradual minimum price increase until integration into the pan-European market and the EU ETS. This serves to (gradually) internalize the cost of GHG emissions in the power sector and ensures that Kosovo gains exemption from the EU's CBAM measures. Whereas the starting year and minimum level of carbon price that power producers have to pay will be subject to negotiation with the EU, preparations for the introduction of a carbon pricing system will be in place by 2025 (see table 7 below). Revenues collected from this system will be one of the sources of a Just Transition Fund, the uses of which will be determined, and may include the promotion of RES, training, and retraining of the workforce, energy-related projects for vulnerable consumers, etc. This will be accompanied by the phasing out of subsidies for fossil fuels.

***Table 8.*** *Kosovo Carbon pricing system*

| Indicator | Baseline | Target for 2025 | Target for 2031 |
|---|---|---|---|
| The gradual introduction of carbon pricing | Not introduced [2021/2022] | Preparation for a carbon pricing system completed | Integration into the EU ETS |

***Source:*** *Kosovo Energy Strategy 2022-2031*[32]

The aspiration to enter gradually 2025 in the Emissions Trading System (ETS) should be considered as a key strategic measure to reduce $CO_2$ emissions in electricity and heat production, due to which the Energy strategy Scenario envisages a carbon-free Kosovo in 2050. Higher $CO_2$ prices and lower natural gas prices in the moderate and green scenario result in the termination of the operation of TPP Kosovo A, which will be complemented by a combination of new RES, natural gas facilities, but also energy from imports. For example, many countries plan to ban the sale of new internal combustion engine vehicles in the next 10-20 years.

[32] Government of Kosovo. Energy Strategy 2022-2031, available at: https://konsultimet.rks-gov.net/viewConsult.php?ConsultationID=41426

The implementation of this policy will start to reshape energy consumption patterns and society more broadly, with, for example, implications on taxation. These changes will reshape how we need to define the Trilemma dimensions for security, equity, and sustainability as we seek to ensure that the Index can continue to monitor energy policy performance.

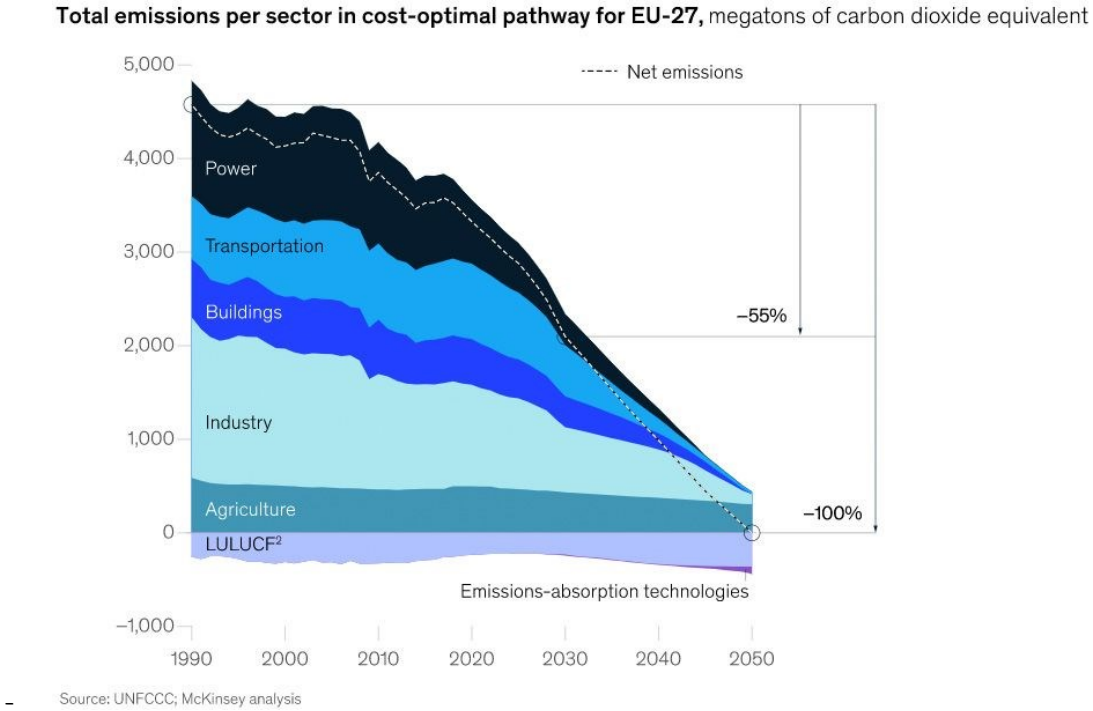



***Fig. 6.*** *Source: UNFCC, McKinsey analysis*[33]

One of the most important support instruments elaborated in the forthcoming Law of RES is the auction for renewable electricity capacities. The use of auction procedures represents one of the most economical and transparent approaches to increasing the deployment of renewable energy capacities. The auction process will begin immediately, with the preparation of documentation for the first auction in 2023. Using the experience gained from the auction the Secondary Legislation on the Law on RES will be developed, and then further auction rounds will be organized in the following years for wind, PV, and other renewable energy technologies.

The advantages of the shift away from coal were motivated by the following reasons:

- Increasing difficulty in sourcing high-quality coal domestically as most of Kosovo's coal has low calorific value and high ash content. This increased the required investment and costs to source coal locally;
- Strong recovery in power demand driven by healthy growth in production levels from electro-intensive sectors such as cement, aluminum, and steel; and
- Environmental concerns related to both coal mining and coal power generation.

To advance Kosovo energy transitions, a holistic approach will improve energy system performance and transition readiness, and turn high readiness into good system performance from at least six dimensions including energy, environmental performance, economic development, investment, technology, and human capital.

[33] "How the European Union could achieve net-zero emissions at net-zero cost," 2020, McKinsey.com

## 6. CONCLUSIONS

The current paper allowed us to understand the Energy Transition Index (ETI) and its use in the Kosovo context, as well as the main issues surrounding the theme of energy transition and post-carbon targets. The energy transition and decarbonization view are currently the main trends because they are closely linked to the concept of sustainable development and the life cycle of products. Looking forward, to meeting Kosovo's energy challenges will require a good understanding of the current state of the energy transition.

Thus, the ETI provides a useful information tool by aggregating a wide range of variables and energy indicators from international datasets covering important dimensions of energy *System Performance and Transition Readiness*. Tracking these metrics enables a better understanding of the past and present state of Kosovo's energy transition. The INDEP model of ETI can help monitor the progress and impact of the energy transition in Kosovo, benchmark against peer economies regionally and globally, and identify priority areas for policy interventions and resource mobilization to accelerate the energy transition.

Crucially, the Energy Transition Index in Kosovo will provide a knowledge base that can improve the future through more informed energy transition policies and investment decisions. In this paper, INDEP established the first Kosovo ETI model as the most comprehensive energy transition index worldwide available due to its coverage of both energy transition system performance and transition readiness dimensions. The insights provided by the relationship between these two categories of scores show one way in which decision-makers can use the ETI in Kosovo. Finally, in this paper, the INDEP author described the way the World Economic Forum utilizes the index as part of a broad stakeholder process to inform global strategy and drive change in the energy transition.

From the analysis in this paper, we believe that now is the time for the government of Kosovo, businesses, and consumers to step up efforts to reduce their heavy reliance on lignite. The government of Kosovo should invest in domestic decarbonized energy systems to ensure affordable and reliable energy, while businesses can adopt low-carbon technologies and energy-efficient processes. Additionally, the ETI should serve as a tool to track Kosovo's performance and readiness scores as well as to identify energy systems' strengths and improvement areas, business opportunities, and threats. It also supports the development of a vision of energy transition, and ultimately, a roadmap. The government of Kosovo needs to take into consideration that the energy transition does not happen overnight and there are high levels of uncertainty in the energy sector (e.g. the pace of technology development, price volatility, etc.). In the long term, we expect the green energy transition in Kosovo will offer win-win opportunities, aligning security and sustainability imperatives through investments in renewables and other clean energy sources, as well as demand-side measures like energy efficiency.

Therefore, the current government plans, which envision only very modest progress on coal phase out would need to be reconsidered to face this reality. However, more work should be done to enhance the energy transition index in Kosovo which can be even more informative for policymakers. We consider that now is the time to strengthen commitments to clean energy investments and anchor more efficient energy consumption habits in Kosovo's society.

Importantly, the Energy Transition Index tool provides a knowledge base that can be used to improve the future by implementing more informed energy transition policies and investment decisions in Kosovo. With this data between reality, possibilities, and set goals in mind, the next few years should mean a significant amount of work and dedication toward intensive energy transition, or rather energy transformation for Kosovo. Nonetheless, only by working together with all energy sector stakeholders in Kosovo will be possible to the collective transition journey to net zero emissions by 2050. We urge the Kosovo government to work on improving its energy institutions by providing a more adequate structure and human resources capable of fully responding to the ongoing energy transition and related tasks. **The time for action is now.**

## 7. RECOMMENDATIONS

The main recommendations of this paper can be summarized as follows:

- **Make decarbonization and emission reduction policy priorities** and accelerate policy implementation. Government should start work on drafting the long term decarbonization strategy. The government should conduct awareness-raising campaigns for the benefits of using decarbonizing the economy of the country. There is a huge awareness and information darkness about the decarbonization opportunities in Kosovo. Thus, the GoK should ensure that consumers are well informed about the rights and responsibilities to switch to decarbonization and circular economy when it is available and its benefits to the climate and health. Most importantly maybe, opening up an honest and inclusive debate about the future of coal should be a matter of good governance. A just transition, from coal which evidently poses challenges, depends on clear communication towards citizens and the stakeholders particularly affected. Diversification towards lower-carbon-intensive fuels and access to alternative sources of energy supplies call for increased public support for gas transit and
- Government should work more to include academia, businesses, and civil society in energy and climate policy-making (Democratization of energy). Public awareness and engagement in early stages of energy transition of civil society energy and environmental NGOs.
  Kosovo Government has an opportunity to "**green transition**" to speed up structural change towards the low-carbon transition and to meet its RES targets. The government should prioritize green investments mainly in RES (solar PV systems) that have strong economic and social benefits and have the potential to reduce emissions, rather than prioritize fossil fuel investments
- Government should start work on carbon pricing and phase out fossil fuel subsidies in order to meet the net zero by 2050. Should set up a working group to see the best modalities for starting the carbon pricing in Kosovo by 2024 or 2025.
- **The adoption of the remaining secondary legislation** required for the implementation of the Energy Efficiency Law should be of the highest priority. This also includes the adoption of the draft plan for implementation of the energy efficiency obligations, a draft long-term building renovation strategy, and a draft plan to boost nearly zero-energy buildings in Kosovo.
- **Government should proceed with the adoption of its first renewable energy law.** Permitting procedures need to be simplified and streamlined to enable faster deployment of renewables. Introduce market-based support mechanisms for renewables and start with an auction as soon as possible.
- **Government investment and public policies are essential to attract large amounts of private capital** and to help offset the declines in fossil fuel income. Secure financing for energy efficiency improvements, including an increased budget for the Energy Efficiency Fund and financial incentives
- **Government should create an appropriate enabling environment for investment in renewable energies**, including a more flexible electricity system and deregulated electricity prices. Boost public sector capacities for energy efficiency improvements and enhance the regulatory framework Create appropriate incentives and enabling conditions

for energy efficiency improvements in buildings. Build up the skills needed for scaling up renewable energies and energy efficiency improvements

- **Energy transition must be a just transition**.
  This challenge is about more than simply energy system performance. The energy transition is a systemic transformation of entire economies and societies. It follows that transition measures must address the issues of *equity, jobs, public health, access, and affordability*. Policy-makers and investors must consider all these issues when evaluating and communicating their decisions, to gain cooperation from a broad coalition of stakeholders.
- **Kosovo Energy regulator as the designated issuing body for guarantees of origin,** the energy regulator should sign a direct agreement with the service provider and begin using the national electronic registry developed during the regional project.
- **The two largest uncertainties in Kosovo's energy system are plant lifetimes and substitutes for coal power.**
  The government needs to make a pledge/decision to retire 2035 the TPP Kosovo A which was commissioned between 1960 and 1970.
- **Boosting energy efficiency and diversification away from lignite is a priority.**
  It could be explored the possibility to establish a fund for the renewal and expansion of domestic electricity generation capacity in green technologies. This could be funded by KEK's exceptional export revenues. Further regional integration, especially with Albania, would allow for a more efficient balancing of generation and loads. Moreover, existing transmission and generation capacity should be properly maintained to increase reliability, and efficiency and reduce pollution. Tackling air pollution is a key priority. In this regard, the focus should be on enforcing regulations for emissions and implementing the installation of filters in Kosova B.

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