



# POWER TRANSITION INDEX IN KOSOVO



February, 2024



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# 1 INTRODUCTION

## 1.1 Context of energy transition

The context of energy transition refers to the sweeping shift from traditional fossil fuel-based energy systems to cleaner and more sustainable sources of energy. The transition is driven by a combination of environmental, economic and social factors, with the main goal of mitigating climate change and reducing dependence on limited energy resources.

The main driver of the energy transition is the urgent need to address climate change. Burning fossil fuels for energy releases greenhouse gases into the atmosphere, such as carbon dioxide, contributing to global warming and climate-related challenges. The transition aims to replace these carbon-intensive energy sources with cleaner alternatives, such as renewables, in order to reduce environmental impacts.

Fossil fuels are finite resources, and their extraction and consumption have geopolitical implications. While conventional reserves are being depleted, developed and developing countries are seeking energy security by diversifying energy sources. Renewable energy, including solar, wind, hydropower and geothermal, offers a decentralized and abundant alternative to energy potential.

Advances in technology have significantly reduced the costs of producing and storing renewable energy. The improved efficiency and falling prices of solar panels, wind turbines and batteries have made energy economically more sustainable, encouraging widespread adoption.

The energy transition presents economic opportunities, including the development of new industries, job creation and innovation. As countries invest in renewable energy infrastructure, there is potential for economic growth and competitiveness in the global market.

Governments around the world are implementing policies and regulations to promote the transition to cleaner energy. These could include subsidies for ESI projects, carbon pricing mechanisms, emissions reduction targets and gradual phase-out of subsidies for fossil fuels. International agreements, like the Paris Agreement, also play a crucial role in shaping the landscape of policies.

It is worth noting that increasing awareness of environmental issues has led to changing consumer preferences. There is a growing demand for sustainable products and services, including energy. Businesses are adapting to these preferences by including RES in their marketing operations and strategies.

The energy transition also emphasizes equality and social inclusion. As new energy systems develop, it focuses on ensuring that benefits are fairly distributed and that vulnerable communities are not disproportionately affected. This includes considerations for job creation, access to clean energy and mitigating any negative social impacts.

In summary, the context of energy transition is multi-sided, driven by a combination of environmental, economic, technological and social factors. This transition represents a global effort to move towards a more sustainable and resilient energy future

## 1.2 The importance of energy transition in Kosovo

The energy transition is of great importance for Kosovo because as we have pointed out above, many factors like environmental, economic and social factors combine.

Kosovo has historically been heavily dependent on lignite for electricity production. This reliance on fossil fuels has resulted in significant environmental degradation, air pollution and greenhouse gas emissions. The energy transition enables Kosovo to shift towards cleaner and more sustainable energy sources, such as renewables, contributing to global efforts to combat climate change.

Burning coal for energy production is a major contributor to air pollution, which can have serious health impacts on the population. Switching to cleaner sources of energy would improve air quality, reducing respiratory and cardiovascular diseases and improving overall public health.

Relying on a single source of energy, such as coal, poses risks to the security of energy supply. The energy transition enables Kosovo to diversify energy production, including renewable sources such as solar and wind energy. This diversification increases energy production resilience and reduces vulnerability to supply disruptions or price fluctuations associated with fossil fuels.

The energy transition could stimulate economic growth in Kosovo. Investments in renewable energy infrastructure create jobs, stimulate innovation and attract foreign investment. Developing a sustainable energy sector can contribute to long-term economic stability and reduce dependence on imported fossil fuels.

Kosovo's effort for European integration is consistent with the European Union's commitment to clean energy and climate goals. Engagement in the energy transition demonstrates Kosovo's commitment to align its policies and practices with European standards, potentially facilitating closer ties and cooperation with EU member states.

Reducing dependence on imported fossil fuels increases energy independence. By leveraging local renewable resources, Kosovo can become more self-sufficient in meeting its energy needs, reducing vulnerability to geopolitical tensions and market fluctuations affecting fossil fuel prices.

Participation in the energy transition aligns Kosovo with the global movement towards sustainable development. Demonstrating a commitment to clean energy can improve Kosovo's international reputation and foster cooperation with other countries, international organizations and financial institutions that prioritize environmental sustainability.

The energy transition provides an opportunity to address social equity concerns. Ensuring that the benefits of the transition are distributed equally, with a focus on job creation and access to clean energy, can positively impact marginalized communities and contribute to a more inclusive and fair society.

Embracing energy transition encourages the adoption of innovative technologies and practices. Kosovo can benefit from technology transfer and knowledge exchange, increasing its capacity for sustainable development and positioning i.e. as a regional leader in clean energy.

In conclusion, the energy transition is crucial for Kosovo's sustainable development, providing environmental improvements, economic opportunities and opportunities to align with global goals and regional integration initiatives. It represents a transformative path to a more resilient, inclusive and environmentally conscious future for the country.

### 3 ELECTRICITY SECTOR IN KOSOVO

#### 3.1 Current sources, import and export of electricity in Kosovo

The electro-energy system in the Republic of Kosovo includes the production, transmission, distribution and supply of electricity, with a predominant focus on the production of basic electricity from lignite as a base material, but not to meet the requirements of maximum charges and to effectively balance the system, presenting a fundamental challenge for all stakeholders in the sector. Addressing this issue is a prerequisite for the sustainable development and efficiency of the electro-energy infrastructure in Kosovo.

In Kosovo, the total operating capacity of electricity generation is currently 1,236 MW. The dominant share of this capacity, which accounts for 960 MW or 77.7%, is derived from thermal power plants using lignite fuel. The remaining capacity consists of RES, including hydropower plants, wind power plants and photovoltaic panels. It is worth noting that two Kosovo A units are currently non-functional.

*Tab.1 Generating capacities in the power system of Kosovo*

Manufacturing units	Capacity of units (MW)	
	Instaled	Neto
TC Kosova A1	65	Nuk operon
TC Kosova A2	125	Nuk operon
TC Kosova A3	200	144
TC Kosova A4	200	144
TC Kosova A5	210	144
TC Kosova B1	339	264
TC Kosova B2	339	264
<b>Total power plants</b>	<b>1288</b>	<b>960</b>
Hydropower plant	132	128
Wind farms	137	137
Photovoltaics	10	10
Total RES	280	276
<b>Total</b>	<b>1568</b>	<b>1236</b>

Despite the old infrastructure of thermal power plants (TC Kosova A and Kosova B) electricity production in Kosovo during the period from 2011 to 2022 has been almost uniform, ranging from 90% to 98%, of total electricity production. This trend underlines the considerable dependence of Kosovo's electricity sector on lignite as the primary source of electricity generation.



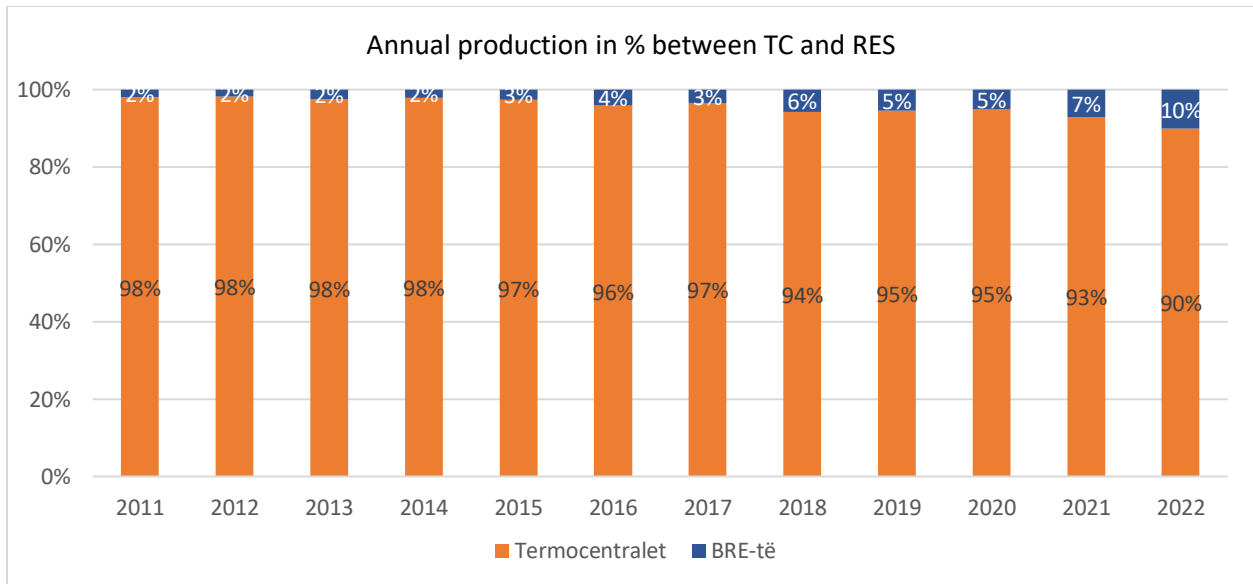
Tab.2 Electricity production 2011-2022

Production 2011-2022(GWh)	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
TC Kosova B	3140	3378	3812	3310	3557	3568	3294	3041	3325	3869	3710	3658
TC Kosova A	1922	1840	1907	1432	1804	2033	1827	1967	2078	2114	2060	2020
RES	105	96	143	102	142	235	179	303	314	318	437	637
<b>Total</b>	<b>5167</b>	<b>5314</b>	<b>5862</b>	<b>4844</b>	<b>5503</b>	<b>5836</b>	<b>5300</b>	<b>5311</b>	<b>5717</b>	<b>6301</b>	<b>6207</b>	<b>6315</b>

The sustainable reliability of TC Kosova A and Kosova B is a testament to their operational viability and the sustainability of existing infrastructure. However, the high percentage of contribution from these power plants highlights the prevailing reliance on traditional non-renewable energy sources.

In recent years, there has been a marked increase in the participation of renewable energy sources, especially wind energy, contributing to overall electricity production. Despite this positive development, power plants still constitute a significant majority, accounting for about 90% of total electricity production.

Fig1. Ratio between power plants and RES for the period 2011-2022



The continued dominance of lignite-based electricity generation indicates the need for a strategic transition towards a more diverse and sustainable energy mix. While the introduction of large capacity wind power (135.8 MW during 2018-2021) is a positive step towards reducing dependence on conventional resources, further efforts to increase the share of renewables are necessary for achieving a more balanced and environmentally friendly energy portfolio.

The following table presents the electricity data available in the Republic of Kosovo from 2011 to 2022, categorized into three main sources: A) Power Plants, B) Renewable Energy Sources, and C) Imports. Exports are presented as negative value for the fact that the same energy is not consumed within Kosovo's power system.

Tab.3 Electricity available as well as reference participation for the years 2011-2022

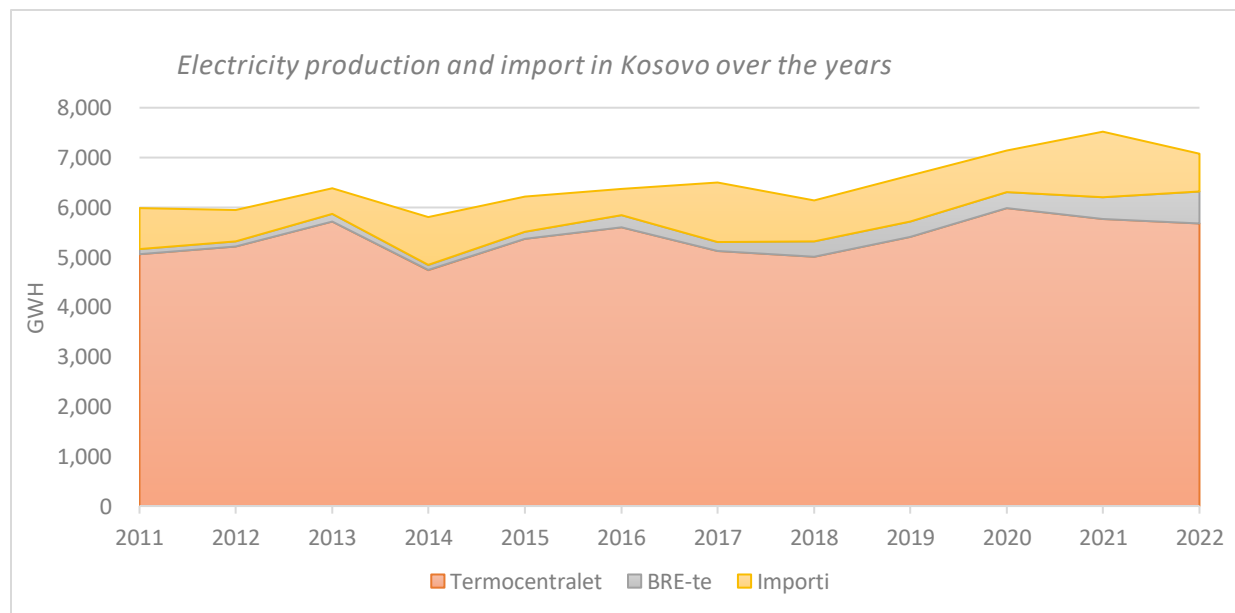
	2011-2022(GWh)	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
A	Termocentralet	5,062	5,218	5,719	4,742	5,361	5,601	5,121	5,008	5,403	5,983	5,770	5,678
B	BRE-te	105	96	143	102	142	235	179	303	314	318	437	637
C	Importi	816	625	522	966	715	534	1,203	825	928	839	1,311	761
	Exporti	(371)	(473)	(857)	(475)	(628)	(1,121)	(880)	(677)	(905)	(1,283)	(835)	(787)
D	Githsej ne dispozicion	5,983	5,939	6,384	5,810	6,218	6,370	6,503	6,136	6,645	7,140	7,518	7,076
	Raporti A/D	84.6%	87.9%	89.6%	81.6%	86.2%	87.9%	78.8%	81.6%	81.3%	83.8%	76.7%	80.2%
	Raporti B/D	1.8%	1.6%	2.2%	1.8%	2.3%	3.7%	2.8%	4.9%	4.7%	4.5%	5.8%	9.0%
	Raporti C/D	13.6%	10.5%	8.2%	16.6%	11.5%	8.4%	18.5%	13.4%	14.0%	11.8%	17.4%	10.8%

As we note TCs, despite fluctuations, they contributed significantly to the total electricity production, occupying about 77% to 90% of the total electricity available over the last 10 years. While the weight of REIs in total available electricity ranged from 2% to 9%, indicating a relatively small but increased contribution to the electricity mix.

From the table it can be seen that during the last 10 years Kosovo has been net importing electricity, with the purpose of fulfilling domestic demand, resulting in fluctuations in the percentage of import contributions to the total electricity available. The ratio of electricity imports to total available electricity fluctuated between 8% and 18%, highlighting the varying dependence on imported electricity to meet domestic demand.

Overall, the data underline the importance of power plants in the mix of electricity generation in Kosovo, with an increased but relatively smaller contribution from renewable sources. The country also relies on imports to bridge the supply-demand gap.

Fig2. Electricity production and import in Kosovo over the years



### 3.2 Impact on the Environment

Kosovo's GHG (GHG) 2021 Report provides valuable insight into the country's emissions sources, trends and a comparative analysis of European Union (EU) averages.

*Tab.4 GHG emissions in Kosovo for 2021*

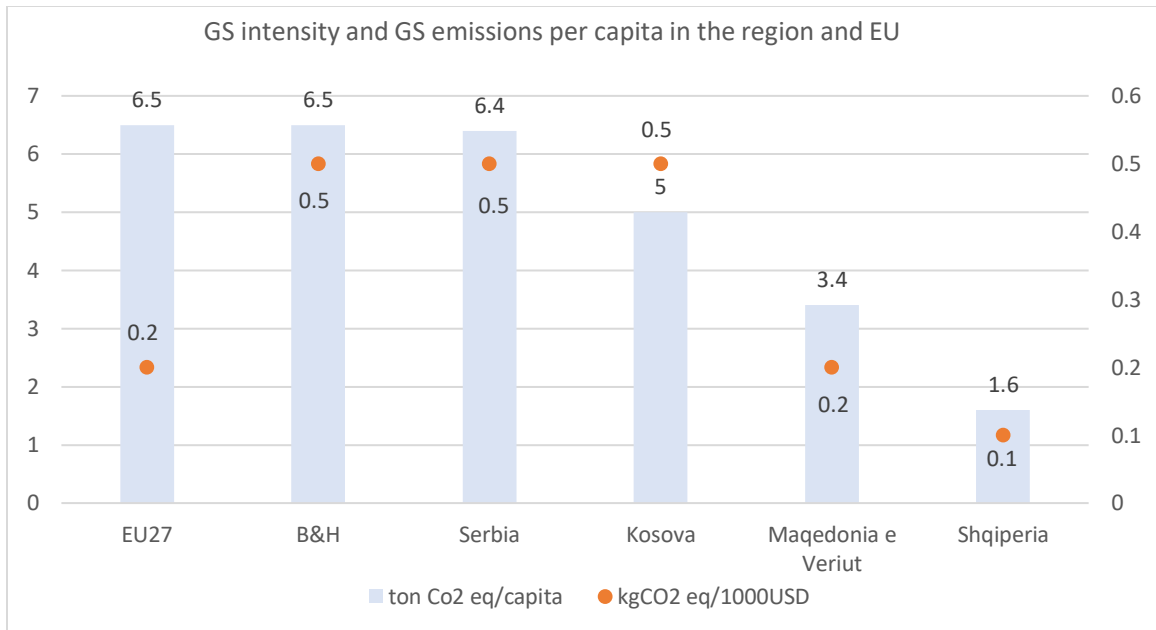
<b>GHG emissions in Kosovo for 2021</b>	<b>Gg CO<sub>2</sub> eq.</b>
Energy	8,624
Industrial processes and product use	130
Agriculture, forestry and land use	773
Waste	457
<b>Total emissions</b>	<b>9613</b>

According to the report, the electricity and heating sector accounts for a significant portion, contributing approximately 66% of total emissions, or with 6316 gg co2 equivalents. Within this sector, electricity production by TC Kosova A and B results as the main contributor.

Despite the fluctuations, the overall trend in emissions has remained relatively uniform over the years, ranging from 8.8 million tonnes of CO<sub>2</sub> in 2014 to 10.2 million tonnes in 2021. This underlines that despite any efforts, the overall level of emissions did not undergo significant changes during the period 2014-2021, with the average energy sector contributing about 85% of total greenhouse gas emissions.

Comparisons with EU averages we notice an interesting contrast in Kosovo's emissions profile. Per capita head, Kosovo's emissions were below the EU average in 2019, indicating that, on average, individual citizens in Kosovo contribute less to greenhouse gas emissions compared to their EU counterparts. However, an interesting fact is that when considering the intensity of GS emissions in the economy. The report notes that Kosovo's economic activities exhibit more than double the intensity of greenhouse gas emissions compared to the EU average. See below the graphic:

Fig 3. GS intensity and GS emissions per capita in the region and EU



Overall economic activities in Kosovo are associated with a higher emission intensity attributed to various factors, such as the dominant role of the electricity sector and heating in the emissions profile and the challenges associated with the transition to cleaner energy sources.

## 4. ELECTRICITY TRANSITION FRAMEWORK IN KOSOVO

### 4.1 Global Energy Transition Trends

The global energy transition is at a critical juncture, where the Russia-Ukraine war exposed vulnerabilities in energy security, leading to emergency measures and revealing risks to energy infrastructure in general. The disruption to Russian gas supply pushed Europe to use strong policy measures, alternative fuel deals, accelerated LNG infrastructure development and regional cooperation, avoiding energy shortages. Still, risks like concentrated fuel mix and insufficient investment emerged. The crisis redirected oil and gas flows, significantly reshaping the geopolitical mirror of energy. Global market volatility affected electricity markets, prompting deeper reforms.

Kriza nënvizoi sfidat e përfshirjes në tranzicionin energjetik. Çmimet e larta të energjisë ndikuan në mënyrë disproporcionale familjet e varfra, duke çuar në inflacion të ushqimit dhe një krizë të kostos së jetesës. Paqëndrueshmëritë e tregut të energjisë ndikuan në konkurrencën e industrive me intensitet energjie, duke ngritur shqetësime mbi punësimin. Qeveritë u përballën me ngarkesa financiare në zbutjen e efekteve të krizës, me subvencionet e karburanteve fosile që tejkalojnë 1 trilion <sup>1</sup>dollarë në 2022. Ekonomitë në zhvillim, tashmë duke u përballur me goditjet e çmimeve, tani përballen me një barrë borxhi në rritje, duke penguar financimin në shkallë të gjerë të nevojshme për tranzicionin e energjisë.

Despite the challenges, energy transitions continued to progress amid extreme instability. Investments in low-carbon energy technologies exceeded \$1 trillion, and landmark initiatives such as the U.S. Inflation Reduction Act and the proposed EU Net Zero Industry Act aim to boost clean energy and innovation. The electric vehicle market experienced record growth and more companies committed to net-zero.

The post-pandemic recovery and the energy crisis triggered a return of coal, posing challenges to emissions reduction goals. The latest IPCC (Intergovernmental Panel on Climate Change) report underlines the urgency of cutting emissions by almost half by 2030 to limit warming to 1.5°C. In this context, countries should accelerate their energy transition, emphasizing equality, sustainability and security. Policies play a crucial role in encouraging clean energy investments, promoting innovation and energy efficiency. Ensuring energy efficiency and providing comprehensive benefits. Balancing current needs with sustainability in the future remains a primary one.

Despite the challenges underlined above, renewable energy distribution has experienced unprecedented growth, underlining the urgent need for innovation in next-generation energy technologies. Significant progress emerged in 2022, as investments in renewable resources rose to a record high of \$1.3 trillion, marking a remarkable 19% increase from 2021 and a significant increase of 70% compared to pre-pandemic levels in 2019<sup>2</sup>. This growth in investment is attributed to countries worldwide expanding their renewable resource capacities, driven by the availability and wide maturity of renewable technologies. To meet the growing demand for clean energy, there is a critical need to invest in innovation that includes alternative fuels, hydrogen and carbon capture and sequestering.

Policies play a key role in driving the trajectory of a progressive energy transition, and their effective implementation is key to shaping its success. Global greenhouse gas emissions coverage has increased

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<sup>1</sup> [WEF Fostering Effective Energy Transition 2023.pdf \(weforum.org\)](#)

<sup>2</sup> [WEF Fostering Effective Energy Transition 2023.pdf \(weforum.org\)](#)

from 69% to 77% globally. <sup>3</sup>Recent influential policies, including the U.S. Inflation Reduction Act, Japan's Green Transformation program and the European Union's Carbon Boundary Adjustment Mechanism, along with the evolution of mandatory and voluntary carbon markets, are accelerating the adoption of clean energy supply. At the same time, they are promoting demand efficiency by facilitating transition-oriented economic growth.

The success of the transition trajectory depends on the quality and effectiveness of these policies. Stimulus investments in enabling transition infrastructure must be balanced with careful consideration of unintended consequences on energy equity and global trade. Achieving the financing needed for a low-carbon energy system requires coordinated efforts by governments, stressing the importance of robust policies and pricing structures to ensure green investments provide an attractive risk-adjusted return.

Finally, the global energy outlook is at a critical juncture, where sustained efforts in policy implementation, innovation and investment will determine the success of the ongoing energy transition. Achieving a delicate balance between economic growth, environmental sustainability and social equity remains essential for a resilient and sustainable energy future.

## 5 KEY INDICATORS OF ELECTRICITY TRANSITION IN KOSOVO

This document focuses exclusively on the indexation of electricity transition in Kosovo, and we are based on data provided by the International Energy Agency (IEA). <sup>4</sup>The primary indicator for assessing the transition of electricity in Kosovo is the renewable energy sources (BRE) capacity for electricity generation.

In the assessment of energy transition in Kosovo we are based on the definition of energy transition<sup>5</sup>, meaning a basic methodology of measurement was used, focusing on the ratio between RES and electricity production from lignite. This metering parameter is essential for assessing the shift towards cleaner and more sustainable energy sources. The analysis includes three distinct periods: the existing period, the medium-term plan by 2040 and the long-term vision by 2050, all aimed at achieving the comprehensive decarbonization of the entire electricity sector.

*The current relationship between RES and lignite electricity generation* - serves as the basis for understanding the starting point of energy transition. The analysis of this period provides insights into existing challenges, opportunities and initial progress made in integrating renewable energy into the electricity generation mix.

Medium-term plan (to 2040): The measurement parameter will be tracked on the medium-term planning horizon, reflecting the planned milestones and targets set for 2040. Monitoring the evolution of the ratio of electricity production from BRE to lignite during this period is essential for assessing the effectiveness of implemented policies, investments and technological advancements.

Long-term vision (until 2050): Long-term vision by 2050 emphasizes the achievement of complete decarbonization of the electricity sector. The measurement parameter will be a key indicator of progress

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<sup>3</sup> [WEF Fostering Effective Energy Transition 2023.pdf \(weforum.org\)](#)

<sup>4</sup> <https://www.iea.org/data-and-statistics/data-tools/clean-energy-transition-indicators>

<sup>5</sup> <https://www.spglobal.com/en/research-insights/articles/what-is-energy-transition>

towards this ambitious goal, implying a significant reduction in lignite dependence and a significant increase in the share of renewable energy in the electricity generation mix.

This measurement methodology provides a dynamic and comprehensive framework for tracking the progress of electricity transition in Kosovo. By focusing specifically on the ratio between REIs and lignite electricity generation at different time periods, the analysis aims to assess the success of transition efforts and contribute to the broader goal of achieving a sustainable low-carbon energy future.

## 5.1 RES capacity in Kosovo

The measuring parameters include and are presented as the following:

1. **Installed capacity:** Total installed capacity of renewable energy sources, including solar, wind, hydropower, and biomass. This measurement reflects Kosovo's commitment to diversifying the mix of resources in electricity production.
1. **Growth Rate:** The annual rate of increase in renewable energy capacities, indicates the pace of adoption and expansion of clean energy sources for electricity generation.
1. **RES capacity in relation to total capacity:** A higher percentage means a greater reliance on renewable resources.<sup>6</sup>

As we have already said, in Kosovo, there is a stable regulatory framework to invest in Renewable Resources for electricity generation. With the implementation of incentive tariffs from 2016 to 2021, 224MW of RES capacities are built in the following table:

*Tab.5 RES installation capacity<sup>7</sup>*

RES within the framework of the feed-in scheme	Unit capacity (MW)		Construction period
	Instaled	Neto	
Hydropower	77.18	77	2016-2021
Wind farms	137	137	2010-2021
Photovoltaics	10	10	2015-2019
<b>Total</b>	<b>224.34</b>	<b>224.34</b>	

RES outside the feed-in scheme	Unit capacity (MW)		Construction period
	Instaled	Neto	
Hydropower	55.25	51.29	1934-2020

<sup>7</sup> <https://www.ero-ks.org/zrre/sq/publikimet/raportet-vjetore>

It is worth noting that from 2018 to 2022, based on the Rules of the Support Scheme, the Energy Regulatory Office (ERRE) has issued decisions for authorizations for the construction of photovoltaic (FV) systems for self-use/production, with a total capacity of 7.8 MW.

The installed capacity of renewable energy sources (BRE) is distributed proportionally between hydropower plants (HC) by 47% and wind by 49%, while photovoltaic capacity accounts for 4%.

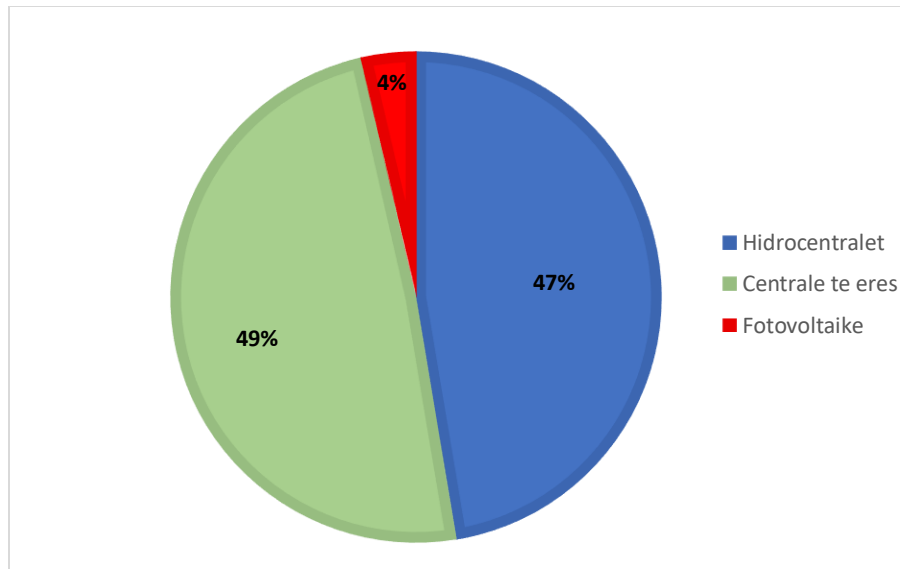
It is worth thinking that this ratio of 47% of the capacities installed by water will be significantly reduced in the coming years because of the fact that new capacities for the production of electricity from water are not provided for in the energy strategy for the period 2022-2031. This is because Kosovo is not a country with great hydropower potential mainly for geographical reasons related to the topographical aspect the relief is mainly in the way of the plateau characterized by relatively mild terrain and little rainfall. In the Western Balkans region, Kosovo is the poorest country in terms of available water resources – 1,600 cubits of water per capita. <sup>8</sup>

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<sup>8</sup> [https://indep.info/wp-content/uploads/2019/03/HIDROCENTRALET\\_NE\\_KOSOVE\\_PROBLEMET\\_DHE\\_POTENCIALI\\_I\\_TYRE\\_REAL\\_BGF\\_IND\\_EP.pdf](https://indep.info/wp-content/uploads/2019/03/HIDROCENTRALET_NE_KOSOVE_PROBLEMET_DHE_POTENCIALI_I_TYRE_REAL_BGF_IND_EP.pdf)

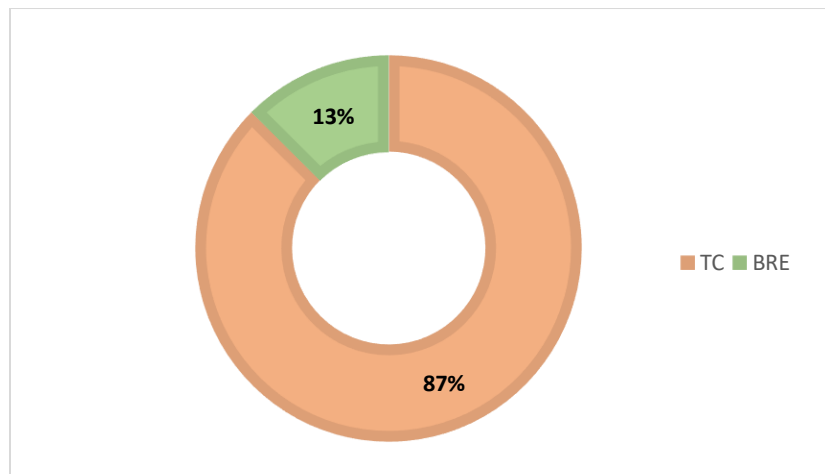


Fig 4. Distribution of RES by energy source<sup>9</sup>



Despite recent investments in renewable energy sources (RES), especially in wind power plants, their total installing capacity remains disproportionate compared to fossil capacities (lignite electricity generation). Total operating capacity from lignite is 1568 MW, while capacity from renewable energy sources is only 224 MW. This results in a proportion of 87%-TC and 13%-RES<sup>10</sup>.

Fig 5. Ratio between RES and TC



## 5.2 Strategic level (objectives) in the development of RES in Kosovo

Kosovo, as a signatory to the Energy Community Treaty (TKE), has pledged to take on obligations towards decarbonisation of the electricity sector, which includes setting mandatory targets for increasing the share of renewable energy in its final energy consumption.. In line with these pledges, Kosovo's Energy Strategy

<sup>9</sup> <https://www.ero-ks.org/zrre/sq/publikimet/raportet-vjetore>

<sup>10</sup> <https://www.ero-ks.org/zrre/sq/publikimet/raportet-vjetore>

2022-2031 was adopted in 2023, and set out 'ambitious' targets aimed at promoting renewable energy and ensuring energy security and sustainability for the country.

Kosovo's Energy Strategy 2022-2031 presents a clear roadmap for the country's transition to a more sustainable and efficient energy future. Taking into account renewable energy sources, especially wind, solar, and its own consumption capacities, Kosovo aims to fulfill its commitments under the Energy Community Treaty and contribute to global efforts to combat climate change. Through effective implementation and active engagement of all stakeholders, Kosovo can unlock the full potential of renewable energy and ensure a greener and safer future for its citizens.

By 2031, 35% of electricity consumption will be covered by renewable energy sources. If in 2022 the participation of RES in total electricity consumption was about 9%, this implies a significant shift from traditional coal-based electricity production towards cleaner and more sustainable sources. The objectives of the energy sources divided below:

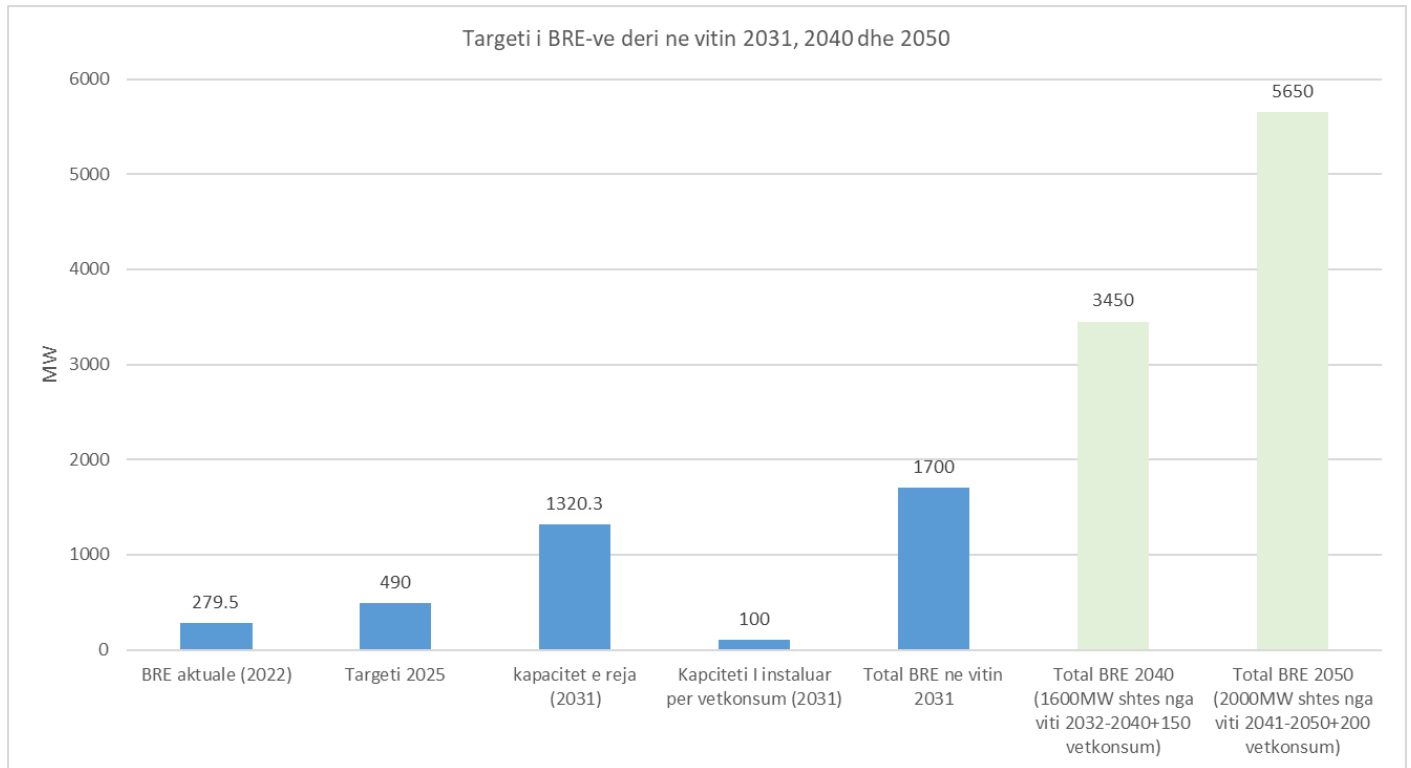
	<b>PV</b>	<b>PV vetkonsum</b>	<b>Ere</b>	<b>Biomase</b>	<b>BRE te reja</b>
22-2031	600 MW	100 MW	600 MW	20 MW	1320 MW
31-2040	800 MW	150 MW	800 MW		1750 MW
41-2050	1000 MW	200 MW	1000 MW		2200 MW
<b>tal</b>	<b>2400 MW</b>	<b>450 MW</b>	<b>2400 MW</b>	<b>20 MW</b>	<b>5270 MW</b>

Thus, the total installed capacity of RES for electricity generation by 2031 is intended to be 1,600 MW<sup>11</sup>. Of these, 1320 new capacities, while 279 MW exist.

*Fig 6. Target of RES by 2031 and the supposed medium-term target for 2040 and that for 2050<sup>12</sup>*

<sup>11</sup> <https://me.rks-gov.net/wp-content/uploads/2023/04/Shqip-Strategjia-e-Energjise-e-Republikes-se-Kosoves-2022-2031.pdf>

<sup>12</sup> The supposed targets for 2040 and 2050 are author ratings

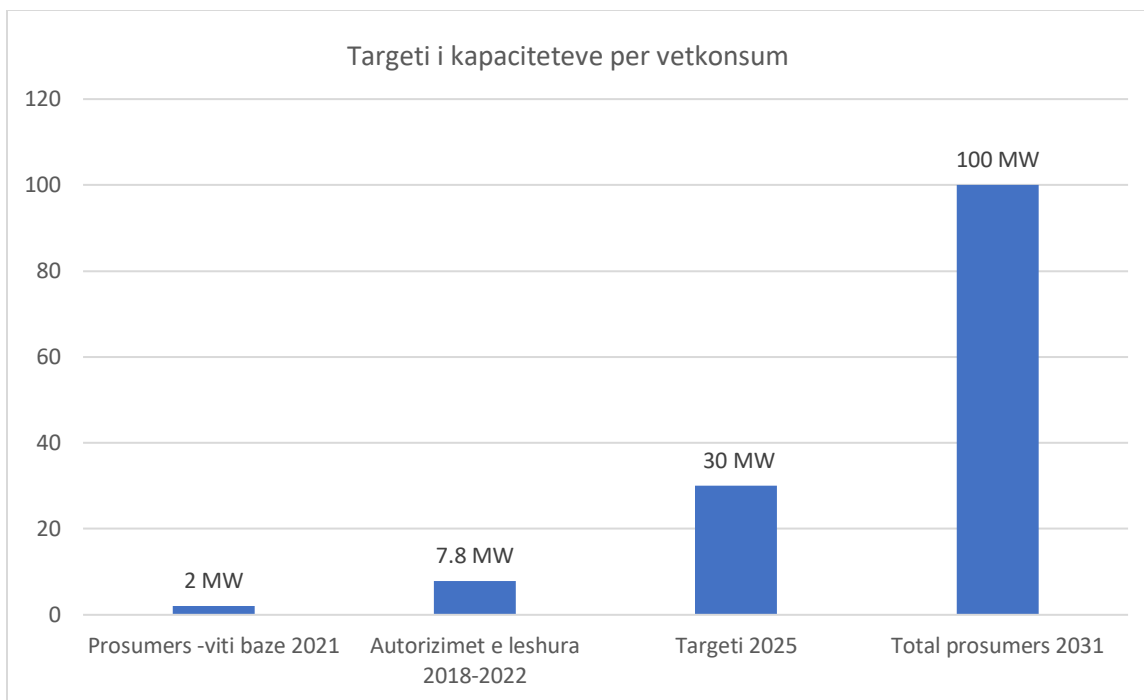


The strategic target of 30 MW <sup>13</sup>for self-consume by 2025 presents a glaring challenge, especially when considering the historical trend of building authorizations in previous years. From 2018 to 2022, in a six-year span, only about 8 MW received construction authorizations. However, in the next period from 2023 to 2025, there is a substantial strategic plan to add an additional 22 MW.

This ambitious goal imposes increased focus and a more accelerated pace of development compared to the past. The adoption of the new regulation on self-consumption may be a key factor in enabling this goal to be realized. The impact of this regulation on facilitating and accelerating approval processes for self-consuming projects is expected to play a crucial role in achieving the 30 MW capacity target by 2025. However, it is essential to closely monitor the implementation and effectiveness of the new regulation to ensure that it conforms to the set objectives and contributes significantly to achieving the ambitious 30 MW target within the specified timeframe.

<sup>13</sup> <https://me.rks-gov.net/wp-content/uploads/2023/04/Shqip-Strategjia-e-Energjise-e-Republikes-se-Kosoves-2022-2031.pdf>

Fig 7. Capacity target for self-consumption



Over the last decade, the total capacity installed through support schemes is 224 MW<sup>14</sup>. Looking ahead, adding 1,320 MW of new renewable energy capacities from 2024 to 2031 could be considered too ambitious. To achieve this goal requires an unparalleled commitment from all stakeholders. Without collective and unprecedented efforts, these figures can remain merely strategic predictions, failing to realize the anticipated progress in renewable energy development towards decarbonization of the electricity sector.

To illustrate what was said above to achieve the strategic goal towards decarbonization of the electricity sector, it would take about 210 MW of additional 210 MW (together solar and wind capacity) to reach the target of 490MW<sup>15</sup> of bre (279.5 MW existing +210MW new), While for the period 2026-2031, on average every year about 165 MW must be installed <sup>16</sup>to reach the final strategic target of 1600MW installed capacities of THES by 2031. From 2032 to 2040 it should be aimed to commission 1600MW<sup>17</sup> of new resilience capacities, while from 2041 to 2050, about 2000MW<sup>18</sup> of new mainly solar and wind capacities should be built (see figure 9).

<sup>14</sup> [https://www.ero-](https://www.ero-ks.org/zrre/sites/default/files/Publikimet/Raportet%20Vjetor/Raporti%20vjetor%202022_ZRRE.pdf)

[ks.org/zrre/sites/default/files/Publikimet/Raportet%20Vjetor/Raporti%20vjetor%202022\\_ZRRE.pdf](https://www.ero-ks.org/zrre/sites/default/files/Publikimet/Raportet%20Vjetor/Raporti%20vjetor%202022_ZRRE.pdf)

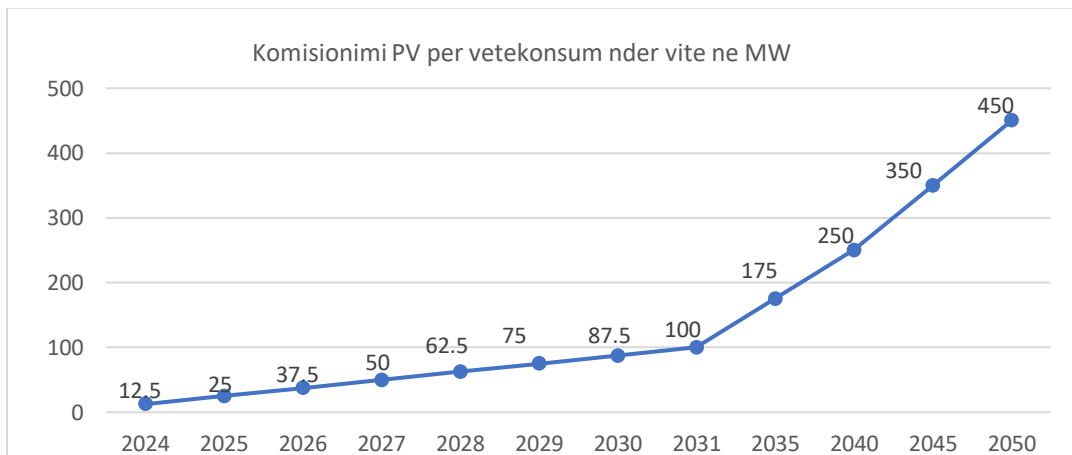
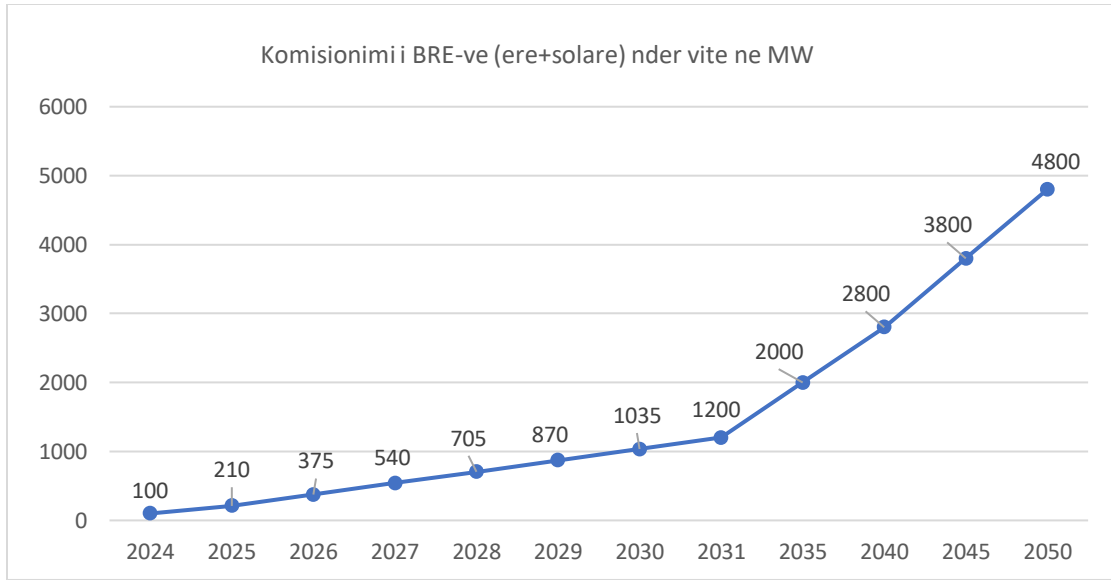
<sup>15</sup> <https://me.rks-gov.net/wp-content/uploads/2023/04/Shqip-Strategjia-e-Energjise-e-Republikes-se-Kosoves-2022-2031.pdf>

<sup>16</sup> Vlersime te author

<sup>17</sup> Vlersime te author

<sup>18</sup> Author rating

Fig 8 dhe 9. Supposed commissioning of RES over the years



For self-consumption capacity, it would take about 12.5MW<sup>19</sup>:

Of course, the installer capacity of RES is a crucial indicator for assessing the switch to sustainable electricity. Equally important, however, is measuring the participation of RES in electricity consumption, determined in megawatt-hours (MWh). According to the strategy, it is aimed not only at increasing the overall capacity of RES, but also significantly increasing their contribution to the total electricity consumed.

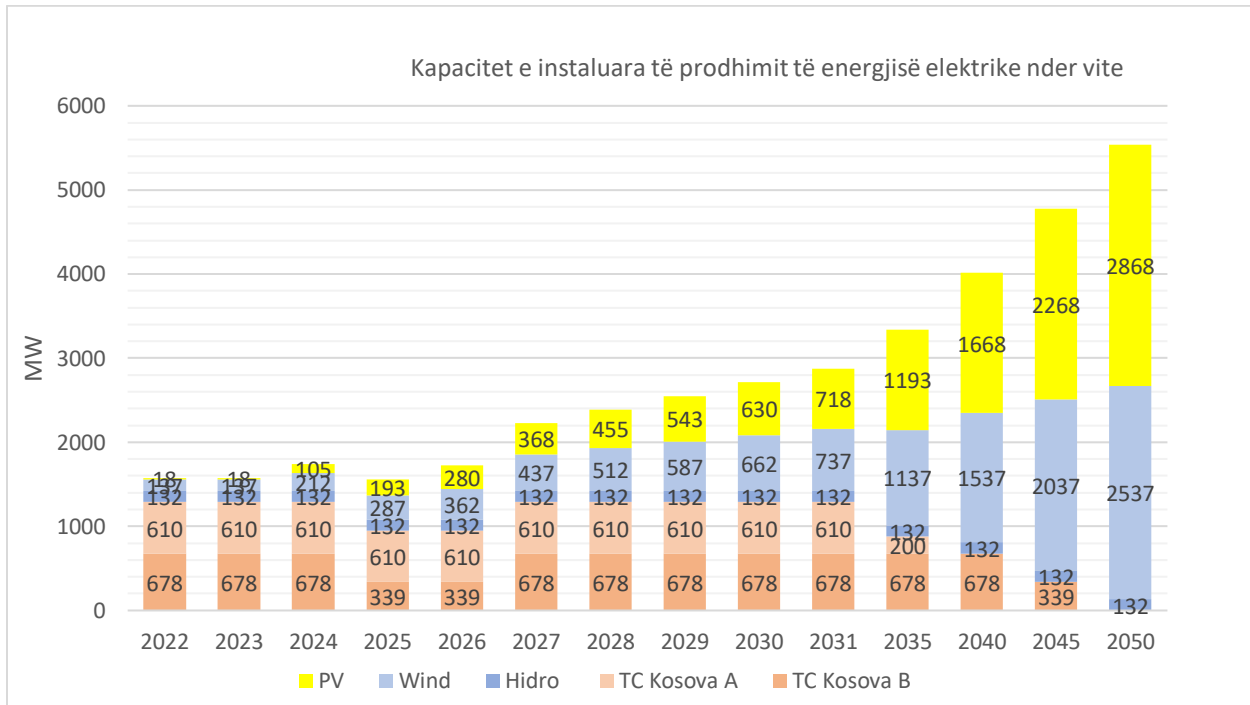
In line with the strategy, the target for 2024 is to have about 13% of electricity consumption sourced from RES. This represents a substantial advance from the 6.3% base value of 2021. This increase in participation

<sup>19</sup> Vlersime te autorit

in RES indicates a noticeable shift towards cleaner and more sustainable energy sources within a relatively short time frame.

To understand the decarbonization of the electricity sector, we must first understand strategic plans related to existing power plants. Based on the energy strategy 2022-2031 below, the production projection by 2031 is built, and our assessments until the full decarbonization of the electricity sector by 2050:

Fig 10. Installed capacity of electricity generation



20

Investments in existing lignite-based generation capacity are considered essential to maintain security of supply. The energy strategy outlines a plan for a comprehensive remounting of two units of TC Kosova B. Rehabilitation is foresighted to be carried out in two phases, namely at the end of 2025 and 2026.

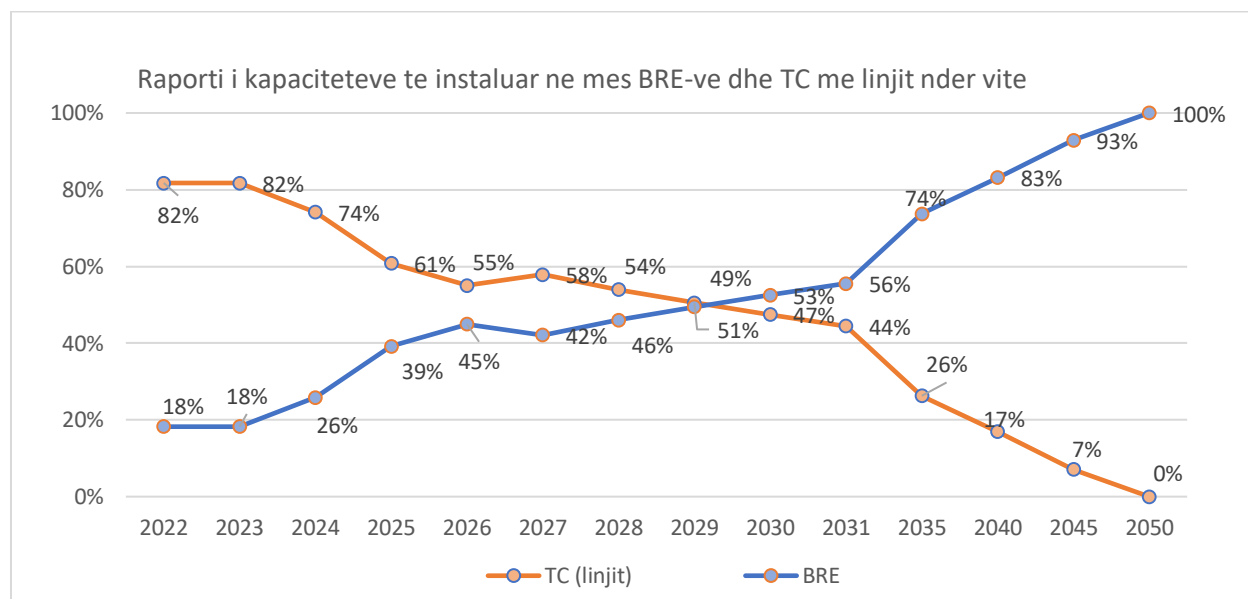
As outlined in the respective Strategy and Implementation Plan, the proposal includes the renovation of at least one, or at most two, of the three units in Kosovo A. After the renovation, TC Kosovo A units will transition to a strategic reserve state starting in 2028. In this mode, they will be available during critical heat seasons with added demand or in exceptional cases as the end of an energy crisis. The third operating unit of TC Kosova A (200 MW) will be permanently closed after the completion of the renovation of other lignite units, expected to be finalised by 2031. By 2040 it is proposed to cover all TC Kosova A units, while by 2045 to close one unit of TC Kosova B, and by 2050 the last unit of TC Kosova B to close

<sup>20</sup> <https://me.rks-gov.net/wp-content/uploads/2023/04/Shqip-Strategjia-e-Energjise-e-Republikes-se-Kosoves-2022-2031.pdf>, si dhe vlersime te autorit

It is worth noting that under the strategy at least 170MW of battery-power accumulation capacity will be installed in its energy system by 2031, of which 35 MW by 2025. It is also set the target of 20MW of biomass energy production, but it remains to be seen whether this target is real because there is a very low interest in building new capacities with biomass.

Below can be seen the proportion of RES in relation to lignite capacities by 2031, where it is seen that in 2029 to equal the installment capacities between RES and those with lignite.

Fig 11. Ratio between RES and TC with lignite



Complete decarbonization of electricity production means that by 2050 the electricity produced by lignite will be replaced with RES capacities. It is recommended to this proportion between THE 2040 BRE and lignite to increase to about 80% and by 2050 to decommission all TCs and installment capacities of RES to be 100%.

### 5.3 Carbon Emissions Reduction Strategies through investments in RES

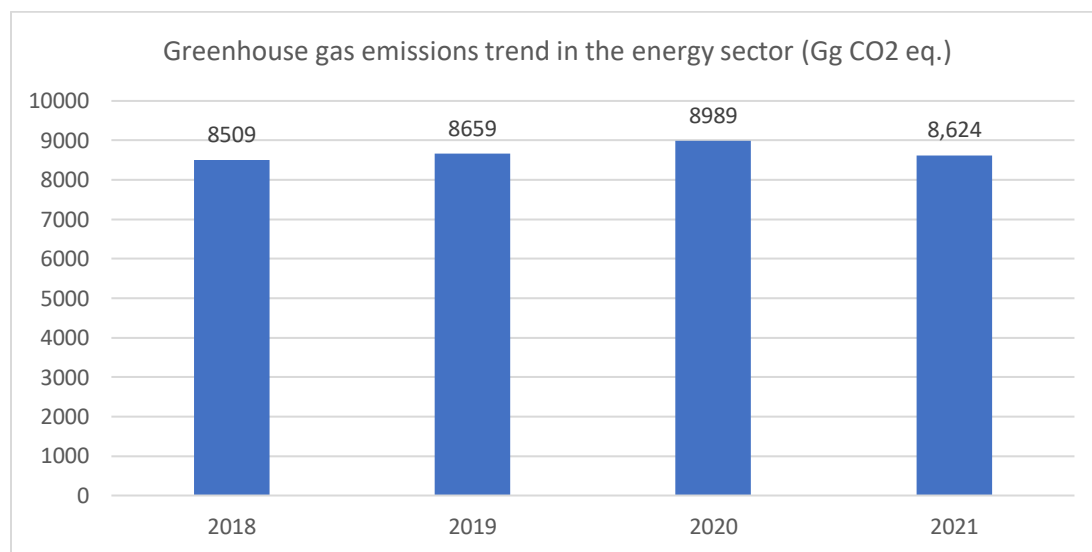
Kosovo is also a signatory party to the Sofia Declaration on the Green Agenda for the Western Balkans in 2020, where it has pledged to reach net zero CO<sub>2</sub> emissions by 2050. In this Declaration, Kosovo has promised to transpose and implement EU legislation relating to the EU Emissions Trading Scheme (EU ETS) and gradually withdraw from coal subsidies.

According to Kosovo's latest greenhouse gas (GS) inventory, annual emissions reached 9.613 million tons of CO<sub>2</sub> in 2019. The share of fuel combustion was 86%, to which the electricity and heating sector contributed 66% (6.316 million CO<sub>2</sub>eq). While pollution from transport and heating is distributed nationwide, the impact of the energy sector is concentrated in one area (in and around the capital, Pristina). The overall emissions trend shows fluctuations, but the level has not changed much over the years for which there is available data, ranging between 8.8 and 10.5 million tons of CO<sub>2</sub>. As seen in Figure

8, per capita emissions were below the EU average in 2019, but the emissions intensity of GS in the economy is more than double the EU average.

In Kosovo there is no trend of emission reduction in the energy sector, where as seen in the diagram below the trend is constant for the period 2018-2021, which once shows the dominance of electricity production by power plants.

Fig 12. Greenhouse gas emissions trend in the energy sector



The strategic integration of RES into electricity consumption is not only aimed at increasing sustainability, but also plays a key role in reducing greenhouse gas emissions. The target set for 2031 is a significant reduction, aiming to decrease greenhouse gas emissions to 32% of the base value recorded in 2019, which was 6316 Gg CO2 equivalent (emissions from electricity generation from lignite).

With the planned coverage of 35% of electricity consumption by RES by 2031, a significant reduction of CO2 emissions is anticipated. Concretely, the goal is to decrease emissions from the 2019 base value of 6316 Gg CO2 to 4295 Gg CO2 (32%).

Looking further into the future, Kosovo should aim for an even more ambitious target for 2040, with the goal of achieving about 70% of the electricity consumption coverage from RES. This increase in dependence on renewable sources is expected to further contribute to reducing greenhouse gas emissions. The aim is to continue the down-trend, making significant progress in mitigating the environmental impact of energy consumption.

By 2050, Kosovo should set a final target: a full 100% reduction in greenhouse gas emissions compared to the base value of 2019. This implies a comprehensive commitment to achieving a carbon neutral state, effectively eliminating the electricity sector's contribution to greenhouse gas emissions, thus shutting down all units of thermal power plants from lignite. Such a milestone would not only represent a major



achievement in the field of environmental sustainability, but also align with broader global efforts to combat climate change, with the ultimate goal of achieving a carbon neutral state by 2050.

## 5.4 Kosovo Policy and Regulatory Environment

Alignment with global energy transition trends is essential for Kosovo to contribute to international climate goals, as outlined in the Paris Agreement. This approximation not only addresses global environmental concerns, but also positions Kosovo as a serious participant. Embracing renewable energy and energy efficiency creates economic opportunities. It could lead to the development of a new green economy, job creation and attract investment in clean technologies. Kosovo can take advantage of these opportunities for sustainable economic growth. Reducing dependence on fossil fuels by diversifying the energy mix increases energy security for Kosovo. This reduces vulnerability to geopolitical uncertainties and price fluctuations in global energy markets. Adaptation to cleaner energy practices contributes to mitigating environmental impacts. Kosovo, like many other developing countries, faces challenges related to air quality and environmental pollution. The shift towards cleaner sources of energy can positively impact public health and environmental sustainability.

All these above cannot be addressed without a stable political and regulatory environment for decoration of the electricity sector.

The Law on Energy No. 05/L-081 is in force, setting the policy of development of THES of Kosovo to exploit the local potentials of RES economically and sustainably. In line with the Energy Strategy, this policy aims to increase energy security, meet needs and protect the environment.

Kosovo, a signatory to the Energy Community Treaty, has legal obligations, including the achievement of the goals of the RES by 2020. Administrative Instruction no. 01/2013, updated with AI No. 05/2017, specifies the annual and long-term goals of BRE at 25% of gross final energy consumption.

ERO applied incentive fees in 2016, but until the end of 2020, where the "feed-in" support scheme was discontinued. But the development of THE ESS projects will be realized through auctions and other mechanisms.

The Energy Strategy for the period 2022-2031 was adopted in March 2023, while the Draft Law on Renewable Sources is being reviewed in the Kosovo Assembly. It is worth noting that the national plan for energy and climate has been developed but has not yet been approved by the relevant institutions.

In 2022, ERO has adopted Regulation No. 1. 03/2022 on the authorization procedure for new generation capacities. In 2023, the self-consumption regulation was adopted, which enables end-users to produce and use renewable electricity.

In Kosovo there is a stable regulatory environment that enables investments in RES for electricity generation based to follow national plans and strategic objectives set by relevant state institutions.

## 5.5 Investments in sustainable technologies in Kosovo

Investments in sustainable technology in Kosovo have been made and continue to be made by the private sector. To support investments in sustainable technology, feed-ins were used, where water-generated electricity (hydropower plants <10MW) is priced at 67.47€/MWh, wind-generated electricity is priced at 85.0€/MWh, solid biomass produced is priced at 71.3€/MWh and electricity produced by solar/photovoltaic panels for targets of up to 10 MW of 136.4/MWh.

*Tab.6 Incentive fees for RES installation capacities*

RES within the framework of the feed-in scheme	Installed capacity and feed-in price		Construction period
	MW	€/MWh	
Hydropower	77.18	67.47	2016-2021
Wind farms	137	85.0	2010-2021
Photovoltaics	10	136.4	2015-2019

ERO decided to stop the application of the Incentive Support Scheme ("Feed – in") for supporting new projects, in building new generating capacities for electricity generation from Renewable Energy Sources (RES) for the 2022-2031 targets, paving the way for alternative financing models such as auctions. To reach the 1200 MW target, Kosovo must develop projects with large photovoltaic and wind capacities. In May 2023, a significant milestone was marked as the country launched the call for the first auction for solar power generation, with installed capacity of 100 MW.

It is worth noting that in October 2023, the Ministry of Economy notifies the general public that it intends to publish another auction in 2024, this time for 150 MW, with the aim of attracting private investment for wind power generation. Although the specific date of the auction is not disclosed, it is said to be in 2024. However, given the four postponements experienced at the first auction, skepticism arises of the simultaneous putting to work 150 MW of BRE capacities each year. This raises concerns of possible failure to reach the 1200 MW target by 2031, including 600 MW from photovoltaic (PV) and 600 MW from wind power.

It's important to remember, there are numerous requirements to invest in large capacities in RES outside the auction procedures, and recent evidence of this trend can be found in one of the last ERA decisions, issued in August 2023. This decision relates to the granting of authorization for the establishment of a solar park with a capacity of 150 MW in the municipality of Gjakova. It has been more than six months since the issuance of the authorization from ERO and there is still no information on whether the project has started to be implemented so it must be monitored if it is to be implemented.

## 6 CHALLENGES TOWARDS ELECTRICITY TRANSITION IN KOSOVO

Despite the high demand to invest in RES and despite the promising potential, bureaucratic challenges have been identified at both the central and municipal level that present a significant obstacle. One notable issue is the lack of uninterrupted coordination between the central level, represented by the Ministry of Environment, Spatial Planning and Infrastructure (MESP), and various municipalities in Kosovo. This lack of coordination stems from a specific regulatory requirement, where solar projects can only be built within municipalities if they are provided for in the Municipal Development Plan (MDP).

Complicating matters, these municipal development plans are developed once every 8 years. Consequently, there is an interpretation that implies an 8-year waiting period for MDP reviews, during which zonal maps and development plans can be harmonized to accommodate solar projects. This timeline poses a significant obstacle. To counter this, it is imperative that the Ministry of Environment, Spatial Planning and Infrastructure cooperate closely with municipalities. The objective here is to create a simplified procedure that allows the construction of solar systems at locations currently excluded from municipal development plans.

Concerns have been raised over the timely realisation of the first auction, as the bidding submission deadline has been extended four times. Originally scheduled for August 15, 2023, the deadline was then moved to September 30, 2023, then to October 16, 2023, and was finally extended to January 31, 2024. These delays conflict with the Strategy Implementation Program 2022-2025, which stipulates that the award notice must be issued within 2023. Ignoring the Implementation Plan and facing frequent delays not only jeopardizes the implementation timeline of the Strategy, but also reduces the importance of this initiative.

To achieve strategic objectives in RES, the following measures must be taken:

- Kosovo should conduct a full review of the factors contributing to delays in the first auction and take steps to improve the process. Clear guidelines, transparent procedures and effective channels of communication should be established to facilitate a more smooth and timely auction process.
- It is essential that Kosovo strictly adheres to the deadlines set out in the Program for implementation of the Strategy 2022-2025. Any deviation from the time limit could disrupt the overall implementation plan, causing obstacles in achieving the annual capacity commissioning objectives of RES.
- Implementing a robust monitoring and evaluation system will help track progress, identify potential obstacles and ensure that corrective actions are taken immediately. Regular evaluations will contribute to the effectiveness of the program and prevent unnecessary delays.
- Strengthening the capacities of the relevant institutions involved in the renewable energy program is essential. This includes providing training to responsible institutions that organize auctions and other interested parties to enhance their skills in managing and executing RES projects.
- Develop and implement a comprehensive risk mitigation strategy to address unforeseen challenges. This includes emergency plans for possible delays, legal or regulatory issues, and other risks that may arise during the implementation of RES projects.
- Fostering an environment favorable for attracting and retaining private investors. Clear and consistent regulatory frameworks, fair and competitive auctions and incentives for investors will encourage participation and contribute to the overall success of the renewable energy program.

- Raising public awareness of the benefits of renewable energy and gathering support for the national initiative. This can help create a positive environment for the implementation of RES projects, facilitating community acceptance and potential regulatory hurdles.

## 7 CONCLUSION

The current disparity in installed capacities between lignite and renewable resources underscores the urgent need for transformative measures in the electricity sector.

While the country has made progress in renewable energy investments, the existing proportions of 87% from lignite and 13% from renewable sources show a serious imbalance. The Energy Strategy for the period 2022-2031 is ambitious, aiming to increase the weight of renewable energy to 35% of electricity consumption by 2031. To achieve this, a significant expansion of renewable capacities is envisaged, with the installation of 210 MW by 2025 and the target of 1600 MW by 2031.

The proposed rehabilitation of TC Kosova B and the status of the strategic reserve for units in TC Kosova A, along with the closure of one unit, illustrates a dual approach. The goal is to ensure the security of the short-term electricity supply through necessary improvements to existing lignite infrastructure, while planning to gradually phase out these TCs, in line with the long-term objectives towards complete decarbonization of electricity production.

The Renewable Resource Bill and the ongoing review of the national energy and climate plan imply a commitment to creating a favorable regulatory environment for investments in RES. The anticipated transformation of the electro-energy system includes not only a significant increase in the capacities of RES, but also the objectives for energy storage through the battery system.

Kosovo is at a key point in its efforts to mitigate greenhouse gas emissions and transition to a sustainable energy future. The latest inventory of GSEs highlights the dominance of fuel combustion, especially in the electricity and heat sector, contributing significantly to the country's emissions. Despite the fluctuations, the overall level of emissions has remained relatively stable, highlighting the need for proactive measures to break this pattern.

The planned shift towards renewable energy sources (BRE) aiming to cover electricity consumption at 35% by 2031 is a positive step. The ambitious goal of reducing emissions to 4295 Gg CO<sub>2</sub> by 2031 signals a commitment to tangible progress. Looking ahead to 2040 and 2050, aiming for 70% and eventually 100% coverage of electricity consumption by RES sets a bold trajectory for Kosovo's sustainable energy future.

While private sector investments in sustainable technology have been constant, challenges emerge with the disruption of incentive tariffs ("feed-in") for new projects. The recent decision of ERO to grant the authorization for the solar park in Gjakova shows a growing interest in large scale BRE projects outside the auction procedures, stressing the need for careful monitoring of the project implementation.

Crucial to this transition is the development of a strategy to modernize electricity grid infrastructure. Improving and expanding the grid, integrating intelligent technologies and incorporating energy storage solutions will enable the uninterrupted integration of renewable electricity generation sources.

Encouraging distributed generation through incentives for rooftop solar panels and small-scale wind turbines can increase grid resilience, reduce distribution grid losses and empower local communities in the electricity transition. Simplification of regulatory processes and provision of support mechanisms for RES projects are essential steps in creating a favorable investment environment.

Private sector involvement is essential and mechanisms like public-private partnerships, incentive tariffs and financial incentives need to be explored to make clean energy projects economically sustainable. The creation of a fund dedicated to financing clean electricity projects, perhaps within the framework of the Kosovo Energy Efficiency Fund, could further accelerate progress.

Cross-border cooperation with neighbouring countries, especially Albania, opens the way for joint renewable resources, liaison projects and regional initiatives, strengthening energy security and sustainability.

Public awareness campaigns play a key role, highlighting the benefits of clean electricity, promoting electricity efficiency practices and encouraging community engagement in saving electricity. Training programs and seminars to increase skills in sustainable energy practices, especially among local technicians, contribute to the promotion of a skilled workforce in the clean energy sector.

In the short term (by 2031), the focus is on eliminating bureaucratic barriers, investing in economically sustainable renewable projects, improving the electricity grid, stimulating rooftop installations and launching public awareness campaigns in a way that reaches the 35% target.

Moving into the medium term (through 2040), objectives should include facilitating larger-scale projects, attracting investment and installing additional capacities. The emphasis is on energy storage technologies, integration of renewable urban resources and regional cooperation. This phase marks an important step towards achieving 70% renewable energy in total installed capacity by 2040.

The long-term vision (by 2050) underlines a commitment to complete decarbonization by reducing dependence on fossil fuels and ensuring resilience. An intelligent, decentralized system with advances in intelligent network technologies and widespread and distributed generation must be enabled. It should target the installed capacity of 5200 MW from renewable sources by 2050, which reflects the commitment to meet all electricity demand by fully integrating into the European market.

To achieve these goals, ongoing efforts are needed to improve regulatory processes, attract private investment and engage with neighboring regions on joint renewable projects. Public awareness, collaboration and training programs will play a key role in gathering support and fostering a skilled workforce.

The successful transition of Kosovo's electricity sector towards sustainability and decarbonization depends on the active engagement of key stakeholders: governmental organizations, the private sector and civil society. Each plays a crucial role in shaping policies, promoting investment and ensuring the harmonization of energy transitions with community values and needs.

Governmental organizations are essential in providing leadership and creating a favorable policy environment. The establishment of an inter-institutional task force, collaborative efforts to improve the regulatory framework and investment in capacity building within government units demonstrate a commitment to effective coordination and informed decision-making. Transparency in policy processes and international cooperation further strengthen Kosovo's position in the global energy mirror.

Private sector involvement is essential to driving innovation and investment. Creating a conducive environment through financial incentives, public-private partnerships and supporting skills development initiatives ensures a dynamic and skilled workforce. Such cooperation fosters a mutually beneficial

relationship between the public and private sectors, facilitating the successful implementation of sustainable energy projects.

Civil society, as the voice of the community, plays a critical role in ensuring that the electricity transition is inclusive and reflective of local values. Meaningful consultations, awareness campaigns and empowerment of civil society organizations contribute to community acceptance and active participation. Monitoring and evaluation mechanisms, together with capacity building for local NGOs, increase accountability and transparency in the process of electricity transition.

Fundamentally, synergy between these stakeholders is essential to achieving the short, medium and long-term outlined goals. The active participation and cooperation of government, private sector and civil society will pave the way for a comprehensive, transparent and successful energy transition in Kosovo, contributing to a sustainable and resilient energy future.

## 8 POLICY RECOMMENDATIONS FOR ELECTRICITY TRANSITION IN KOSOVO

Kosovo must set clear and ambitious targets for the share of renewable energy in the electricity generation mix beyond 2031, with strategic policies towards full decarbonisation of the electricity sector by 2050. A roadmap for moving away from fossil fuels and increasing the use of clean and sustainable energy sources must be developed.

A strategy for developing and implementing national policies for modernization of the electricity network infrastructure should be developed. This is vital and includes upgrading and expanding the grid to accommodate the integration of renewable energy sources, intelligent grid technologies and energy storage solutions.

Incentives for distributed generation such as rooftop solar panels and small-scale wind turbines should be created. Encouraging decentralized power generation can increase grid resilience, reduce losses in the distribution grid and empower local communities to take an active part in the electricity transition.

In Kosovo, regulatory processes should be simplified and provide support mechanisms for renewable energy projects. This includes creating a favorable regulatory environment, simplification of permit procedures and providing financial incentives to attract investment in renewable energy infrastructure.

Develop frameworks for attracting private sector investment in electricity generation projects. This can be achieved through mechanisms such as public-private partnerships, incentive tariffs and other financial incentives to make clean energy projects economically sustainable.

Creating a fund specifically dedicated to financing clean electricity projects. This fund can provide financial support, loans or guarantees to promote the development of renewable energy projects and initiatives to improve the grid. To speed up the process, programs within the Kosovo Energy Efficiency Fund can be offered

Kosovo should cooperation opportunities with neighboring countries (e.g. Albania) for cross-border electricity projects. This could include shared renewable energy sources, interconnection projects and joint initiatives to enhance regional energy security and sustainability.

The important part of the energy transition is to start with public awareness campaigns to educate citizens about the benefits of switching to clean electricity, including reducing emissions, improving air quality and long-term energy sustainability. Also encouraging energy efficiency practices in consumers, emphasizing the importance of reducing electricity consumption and adopting energy efficient technologies. This could include information on smart home appliances, energy efficient appliances and responsible electricity use.

Fostering community engagement in energy conservation efforts. Encourage local communities to organize energy saving initiatives, promote energy-conscious behavior and participate in demand management programs.

To ensure the success of strategic objectives, Kosovo must take some essential measures. A thorough review of the factors causing delays in auctions, compliance with implementation deadlines and the creation of a robust monitoring and evaluation system are necessary. Strengthening institutional capacities, implementing risk mitigation strategies and fostering a favorable environment for private investors are vital actions.

Public awareness and support should be the main drivers for the success of the electricity transition. Creating a positive narrative about the benefits of renewable energy can facilitate community acceptance and overcome potential regulatory barriers. In essence, a comprehensive and well-coordinated approach, coupled with timely actions and continuous public engagement, are essential in leading Kosovo towards a sustainable energy future and for greenhouse gas reduction.

Kosovo's journey towards a sustainable and decarbonized electricity sector requires a comprehensive and forward-looking approach. Setting clear and ambitious targets beyond 2031, along with strategic policies for complete decarbonization by 2050, will provide a roadmap for phased exit from fossil fuels (lignite).

Finally, it is recommended to offer training programs and seminars to raise awareness and skills about sustainable energy practices. This could include training for local technicians for the maintenance and installation of renewable energy systems, fostering a skilled workforce in the clean energy sector.



## 9 IMPLEMENTATION ROADMAP OF ELECTRICITY TRANSITION IN KOSOVO

To address the implementation roadmap, the short-term, medium-term objectives and long-term vision towards complete decarbonization of the electricity sector, presented in the form of a table as follows:

<b>Short-term goals (by 2031):</b>	
➤	Eliminate bureaucratic procedures as outlined in Chapter 7 and accelerate the adoption of renewable energy projects, aiming to reach the 35% renewable energy target in the electricity mix by 2031.
➤	Identify and invest in renewable energy projects that are available and economically sustainable, focusing on small and medium-sized solar and wind energy initiatives that can be implemented quickly to reach the target of 1200MW new EB (600MW-solar and 600-wind).
➤	Upgrade and expand the electricity grid to accommodate the integration of additional renewable energy capacities. Increase network flexibility and battery deployment by 2028 to manage electricity generation from RES.
➤	To start immediately with incentive programs no later than 2025 for residential and commercial rooftop photovoltaic installations, encouraging widespread adoption by 2031 (reaching the target of 100MW per consumer).
➤	Start immediately in mid-2024 with public awareness campaigns to inform citizens about the importance of reaching the renewable energy target of 35% by 2031, in order to increase support and understanding for short-term renewable energy projects.
➤	Not farther than 2026, the national strategy for the complete decarbonization of the electricity sector would be developed, where the targets for 2040 and 2050 of the RES would be set, where all electricity demand would be covered by renewable energy sources.

<b>Medium-term goals (by 2040):</b>	
➤	Facilitating the development of larger-scale renewable energy projects, such as utility-scale solar and wind farms.
➤	Implementing policies and financial mechanisms for attracting investment to projects that contribute significantly to the transition, with a target to achieve further targets by 2040. About 1600MW of additional capacity to be installed during the period 2032-2040 which would reach about 70% of the total installed capacity of electricity sources (1600MW by 2031 and another 1600MW by 2040).
➤	Invest in energy storage technologies and explore innovative storage solutions to ensure a reliable and sustainable energy supply by 2040.
➤	Focus on increasing renewable energy capacities in urban areas, integrating sustainable solutions into big city planning. Encouraging the adoption of solar panels in public buildings and promoting the development of localized clean energy projects by 2040.
➤	Increase cooperation with neighboring regions to share renewable energy resources and explore common projects. Enhance regional cooperation to optimize energy production,

improve energy security and create a more interconnected and resilient joint electricity network by 2040.

**Long-term vision (by 2050):**

- Work towards achieving the complete decarbonisation of the electricity sector by 2050 includes progressively reducing dependence on fossil fuels and ensuring a resilient and secure energy supply entirely from renewable sources.
- Develop an intelligent and decentralized system where clean energy is generated closer to the point of consumption. This includes further advancements in intelligent network technologies, decentralized energy storage and widespread adoption of distributed generation, aiming for full realization by 2050.
- To aim for the complete decarbonization of the electricity sector, it should be aimed at installing at least 2000MW of new capacities from RES for the period 2040-2050. In total there should be at least 5200MW (this includes new construction for the period 2024-2050) installed capacity of RES in 2050 to target the full supply of electricity demand, under the assumption that all power plants will be closed by 2050, also assuming that Kosovo's power system is fully integrated into the integrated European market.
- Integrating renewable energy into broader economic development strategies, using clean energy as a catalyst for sustainable economic growth. This includes job creation, attracting investments and drive innovation in related industries with the aim of achieving a fully decarbonized and sustainable economic model by 2050.
- Continue efforts in public engagement and education to provide continued support for clean energy initiatives. Fostering a culture of energy efficiency, environmental responsibility and awareness of the long-term benefits of a fully carbonized and sustainable energy future by 2050.

## 10 STAKEHOLDER ENGAGEMENT

Stakeholders in the electricity transition include government organizations, private sector and civil society.

Governmental organizations play a key role in shaping and implementing policies that promote energy transition in Kosovo's electricity sector. To improve the Energy Transition Index, cooperation and engagement within government entities are essential and should include:

- Establishing an inter-institutional task force focused on coordinating energy transition policies. This ensures alignment between different government bodies, improving decision-making processes and optimizing resource allocation for effective implementation.
- Work collaboratively to improve and adapt the regulatory framework regulating the electricity sector. Review and update regulations to address new challenges and opportunities related to renewable energy integration, modernization of the grid and the achievement of clean energy objectives.
- Investing in capacity building of government organizations involved in the electricity sector. Providing training programs to improve understanding of renewable energy technologies, network management and sustainable practices, enabling informed decision making.
- Promote transparency in decision-making processes regarding energy policies. Engaging stakeholders through open dialogue, public consultations and regular reporting mechanisms to ensure accountability in the implementation of energy transition initiatives.
- Governmental organizations should actively collaborate with international partners to leverage expertise, share best practices and access financial resources for sustainable energy projects. Participation in global initiatives can improve Kosovo's position in the international energy community.

While private sector engagement is essential in driving investment, innovation and successful implementation of clean energy projects. Cooperation with businesses is essential to achieving the goals set for the complete decarbonization of the electricity sector and should include:

- Creating a favorable environment for private sector investments in the electricity sector. Provide financial incentives, tax reliefs and simple permitting processes to attract businesses to invest in renewable energy projects and similar technologies.
- Promoting public-private partnerships for the development and operation of renewable energy infrastructure. Increase cooperation with private entities to share risks and responsibilities, fostering a mutually beneficial relationship for the implementation of sustainable energy project.
- Support skills development initiatives within the private sector to provide a workforce equipped with the knowledge and expertise needed for renewable energy projects. This may include training programs, workshops and partnerships with educational institutions.

As regards civil society, their commitment is essential to ensure that the energy transition is inclusive, transparent and in line with community values and needs:

- Facilitating regular and meaningful consultations with local communities affected by RES projects. To include the contribution of civil society to decision-making processes to address concerns, increase project acceptance and build a sense of ownership among citizens.
- Conducting awareness campaigns to educate the public about the benefits and implications of energy transition. Equip citizens with the knowledge to make informed decisions, participate in energy saving practices and advocate for sustainable policies.
- Empower civil society organizations to advocate for the adoption of renewable energy and sustainable practices. Support for initiatives that promote clean energy awareness and encourage community-led renewable energy projects.
- Facilitating active participation of civil society in monitoring and evaluating the performance of energy transition projects. Creating mechanisms for regular feedback and reporting, creating a transparent and responsible environment.
- Capacity building of local nongovernmental organizations (NGOs) to engage effectively on energy related issues.







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