balkan green foundation

HEINRICH BÖLL STIFTUNG

Decarbonizing the Heating Sector in Kosovo

Table of Contents

Abbreviations

CO_2 - Carbon Dioxide

DH - District Heating

EC - European Commission

EE - Energy Efficiency

ERO - Energy Regulatory Office

EU - European Union

GDP - Gross domestic product

GEFF - Green Economy Financing Facility

GWh - Gigawatt hours

HP - Heat Pumps

KAS - Kosovo Agency of Statistics

PV - Photovoltaic

SAA - Stabilization Association Agreement

Executive Summary

There is no doubt that decarbonising the heating sector in Kosovo is a gigantic and challenging task. This challenge becomes even more difficult due to the high energy intensity of the Kosovar economy and the low energy efficiency overall, particularly in the residential sector.

Energy poverty, lack of creation of a new strategic national plan for heating and its implementation, high dependency on: fossil-based electricity generation, extensive use of unsustainably procured biomass sources, the use of old and inefficient heating appliances, lack of district heating systems (DH) and lack of incentives to use sustainable heating technologies, make this challenge even harder and multi-dimensional. These all create health problems for the population of Kosovo, add a high economic cost, including opportunity costs and hamper the sustainable development of the country by undermining the multiplier effect, that the decarbonization of the heating sector would bring to the economy of the country, such as energy savings, import substitution, more employment and production in the energy efficiency sector and a higher productivity of the labor force and reduced health bills.

"There is no doubt that decarbonising the heating sector in Kosovo is a gigantic and challenging task"

As such a multi-stakeholder approach is needed to find joint solutions to improve environmental outputs of such an important sector. A set of incentive measures, policy tools and concrete actions are presented in this paper that decision makers can take in order to improve the situation on the ground. Thereby adoption of these measures will improve public health, increase productivity and increase the wellbeing of the communities through the mitigation of air pollution locally, and reduce carbon footprint globally. Such measures include incentivizing energy efficiency, extending DH where available, construct new DH plants based on biomass and educate people in changing their behaviour towards their use of energy for heating.

Different countries have shown that it is possible to have a clean heating sector even for countries that are fully dependent on fossil fuels. Policies and supportive mechanisms, raise of awareness, eco-design standards and preparation of a strategic national heating plan with specific actions and objectives, as first steps will establish a strong base toward the decarbonising heating sector.

This study besides a situational analysis, and the offering of recommendations, describes the best practices from countries that are pursuing the path of decarbonisation and the future of the heating sector. This short study also offers the best alternatives that the people of Kosovo have in terms of alternatives for space heating for their buildings.

Situational Analysis

The heating sector in Kosovo is regulated under the Law on Energy and other important strategic and policy documents include: the Energy Strategy of Kosovo, the Heating Strategy for Kosovo (2011 - 2018) the National Energy Efficiency Action Plan (2019-2021). Kosovo's membership in the Energy Community Treaty has obligations to adopt and implement also the: Energy Efficiency Directives, Large Plant Combustion Directives etc. As a Contracting Party of the Energy Community and as a signatory of the Stabilization and Association Agreement (SAA), Kosovo is obliged to transpose and implement the Acquis Communautaire related to Energy Efficiency [1].

Kosovo as a member of the Energy Community Treaty has obligations that relate to the integration of renewable energy in the overall energy mix, as such Kosovo's target of 25% renewable energy in the total mix was achieved at a level of 25.69% in 2019 [2]. However the discussed target of 32% by 2030, is going to be hard to be achieved only by the integration of firewood and biomass for heating which is mostly procured in an unsustainable manner. Therefore, more investments to be made directly in energy efficiency and renewable energy are much needed, particularly, in electricity production, further in the heating sector and transportation, in order to achieve the set obligations and targets.

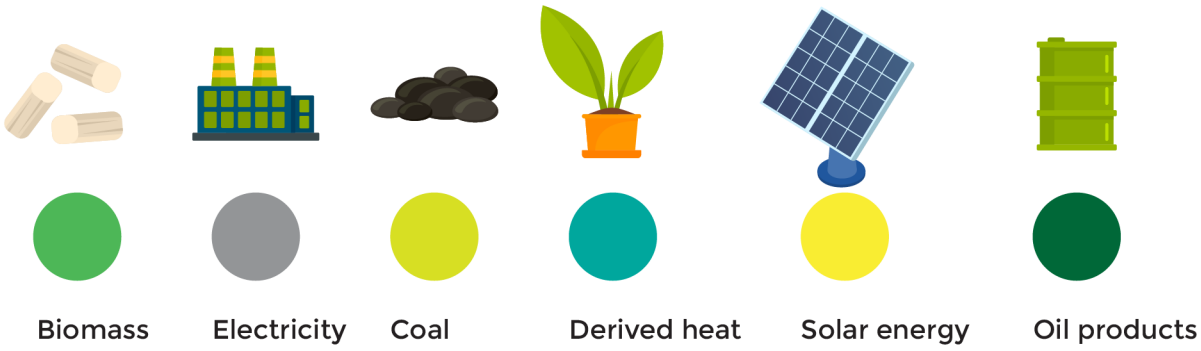
Documents and strategies related to the planning of the heating sector in Kosovo are poor and do not provide any ambitious sustainable future. The last document that depicts the heating plan of Kosovo is "Heating Strategy (2011-2018)". The report "Energy Strategy of Kosovo (2017-2026)", gives several objectives related to the heating sector that are mainly: extending the current existing heating networks, conducting feasibility studies for municipalities that do not have DH and master plan of gas. Unfortunately, today, still there is not any national document that foresees the future of the heating sector for Kosovo. In the revisal of the Energy Strategy, the heating sector should be covered and provide tangible and practical options to the citizens of Kosovo. These have to be in line with Kosovo's obligations towards achieving its decarbonization targets and be realistically implementable. Otherwise, there is the risk of running yet again on having good policy documents while the implementation of them is impossible to happen, as plans are devised too ambitious, or they do not have substance in follow up and therefore unimplementable.

"Therefore, more investments to be made directly in energy efficiency and renewable energy are much needed, particularly, in electricity production."

[1]The current Energy Strategy of the Republic of Kosovo 2017-2026 is being revised, and will cover the period from 2022 - 2031 and the district heating sector is expected to be covered in this strategy as well.

What is the current heating situation for Kosovo's citizens?

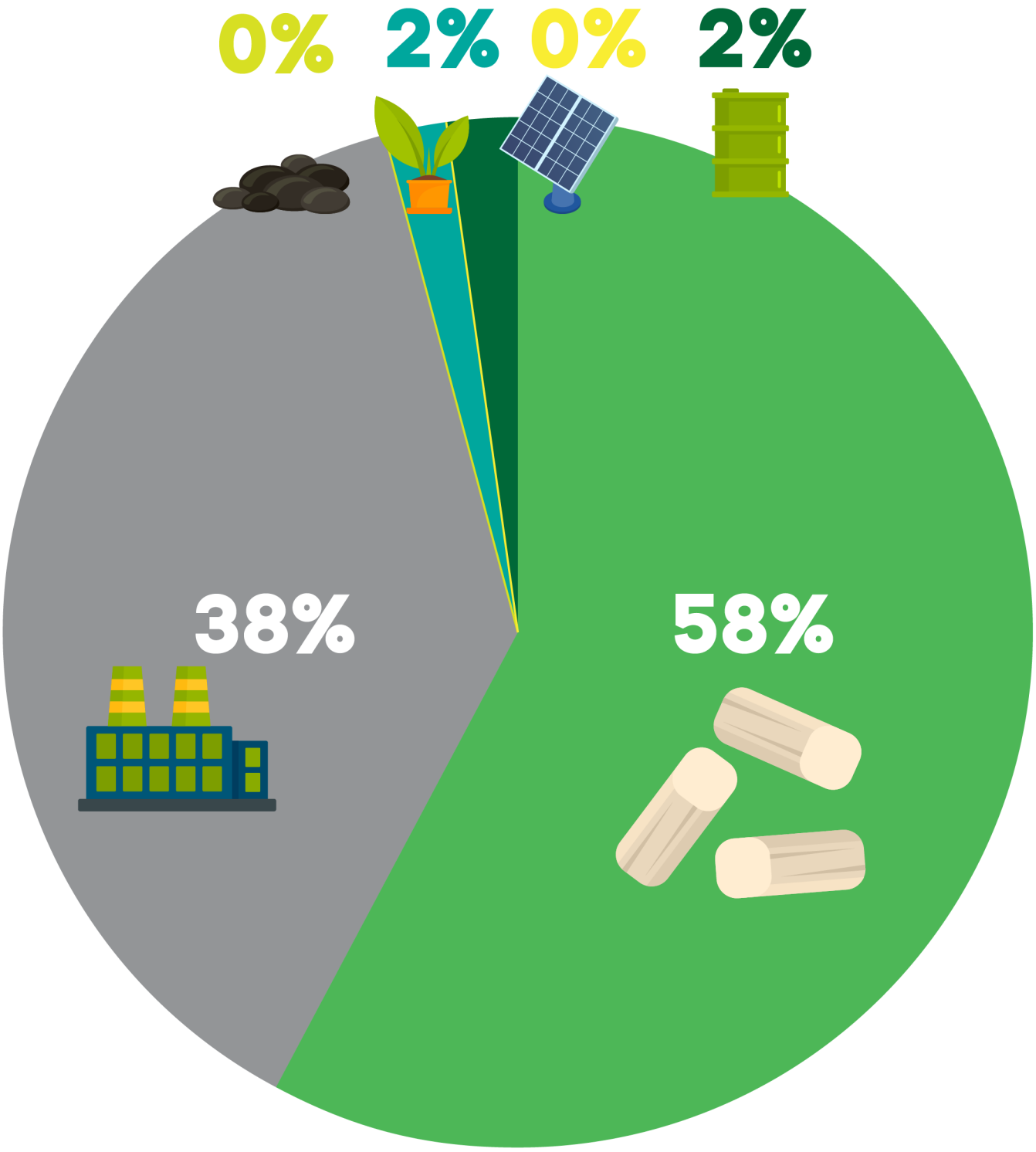
The heating sector in Kosovo is characterized with individual and autonomous heating systems, as well as, with very low development of District Heating (DH). The main energy sources that the citizens of Kosovo use to provide heat comes mainly from burning firewood and the use of extremely polluting lignite for smaller individual heating systems. Electricity has taken more space in the heating sector and is becoming more and more important as GDP rises at an average rate of 4% annually. On the other hand, the share of natural gas in the heating sector is minimal in Kosovo.



KAS: Overview of consumption of all resources of energy in the household sector (%)[2]

According to the Kosovo Agency of Statistics (KAS), biomass has the largest share of energy for heating in the residential sector at a level of 58% in 2020, followed by electricity consumption in the heating sector at 38%. For the industrial sector the total main energy used and the most important source derives from oil products 63%, Electricity at 27%, 5% goes for coal and 5% biomass. In the services sector, Kosovo has a different situation where electricity is the key energy source used at a level of 55%, 28% for oil products, 8% biomass, coal at 5% and derived heat at 4%.

Based on the data from the Agency of Statistics of Kosovo, biomass consumption has continued to increase by 60% from 2012 to 2020. More than 40% of households in 2018 cannot heat their homes adequately. Close to a quarter of households in Kosovo, have problems with basic insulation in their homes, such as leakages in different places as result of poor insulation.



Therefore the situation on the ground creates problems for the economy and the population of Kosovo. The lack of insulation and energy efficiency measures, the overreliance on unsustainable energy sources, create the need for diversification of heating sources and improve health outcomes and productivity of the population of Kosovo. This from a technical point of view.

On the other hand no supportive policies exist by the state, be it in financial easement for wider adoption of EE measures, and the polluter pays principle is not implemented, the externalities are passed on to the society. No tax incentives are in force for EE and decarbonization of the heating sector in place, such as EE devices, insulation materials, or services. The EE Fund is not available for the residential sector. Only the public sector buildings are included in the Fund. No awareness raising is done in a systematic manner, this is mainly undertaken ad hoc by CSO's.

2 KAS: Energy Balance in the Republic of Kosovo in 2020, https://ask.rks-gov.net/media/6181/energy-balance-2020.pdf

Current Available Space Heating Options for Kosovo

Providing space heating for the citizens of Kosovo is difficult. More than 40% of citizens cannot afford to provide sufficient heating for their homes [6]. The current space heating available options are highly dependent on firewood and electricity, and the production and use of these sources has been mostly conducted in an unsustainable manner.

Firewood

heating with wood sources in Kosovo is done in an unsustainable manner, mainly due to: illegal cutting of fire-wood, mismanagement and lack of sustainable forestry practices and inefficient old heating appliances [3]. This leaves behind waste environmental problems, including destruction of forests, loss of habitat, destruction of water streams, erosion, air pollution, to name just a few, however it remains the most readily available source for the majority of the population.

Electricity

The use of electricity to provide heating - not only that is unsustainable (as the main source of electricity comes from Kosovo A and B (lignite plants)) - is also a burden for the electricity grid, as higher demand for electricity is needed. Consequently, this leads to overloading of the electricity grid, which leads to frequent outages. Moreover, heating with electricity increases the demand, and as a result, increases the import of electricity from neighboring countries. Conventional heating appliances have a very low efficiency and overburden the grid, as well as, are financially very costly to run compared to heat pumps (HP) and new technologies.

Renewable energy

in the heating sector is very small, with rooftop solar and water heaters as the most prevalent form of energy from alternative sources, while geothermal energy is used in extremely rare cases and largely unexplored. Innovative solutions such as wind energy for heating are basically non-existent.

District Heating

In Kosovo, there exist four district heating systems in four municipalities, Gjakova, North Mitrovica, Prishtina and Zvecan. Their penetration is low (heating network is concentrated mainly in urban areas). The DH uses coal (94%) and petroleum products (6%) as primary fuels [4]. Apart from Gjakova, which has constructed a biomass cogeneration plant lately of a total installed capacity of 1.2 MW according to data from ERO. This plant is a model plant that can be replicated in other municipalities as well as it uses the leftovers from agriculture in order to generate heat and electricity, thereby for example reusing in a sustainable form the leftovers from vineyards and from fields.

Heat pumps

New technologies are improving efficiency both in demand and in production and HPs are becoming ever more important. These appliances, depending on the outdoor temperature can have an astounding energy ratio of up to 10-15 times the energy they consume in form of thermal heating, compared to natural gas that has a ratio of just 50-90%. HPs can be extremely important in tackling climate change especially when they are combined with electricity produced from renewable energy [5]. This derived thermal energy from HPs running electricity are extremely important in tackling air pollution and increasing energy efficiency, as well as lowering the demand for firewood and the use of other polluting forms such as coal, particularly in urban areas, reducing operational costs as well. However, the initial capital price for buying these appliances need to be lowered in order to increase the amount of the devices being applied en masse. This lowering of the price can be achieved through fiscal/tax measures.

Natural gas

is not naturally available in the country and has to be imported either in pressurized containers or through the building of a vast and expensive pipeline network that makes the whole process questionable in terms of feasibility and price volatility makes this option rather risky.

Decarbonising heating sector of Kosovo – Best practices

Most of the heating consumed uses forms that are carbon based, therefore their sustainability in the long run is very questionable. There is an urgent need to decarbonize the heating sector in Kosovo, as one of the most polluting sectors in terms of air pollution, especially as we can witness during the winter time. Transitioning to renewable energy in this sector is extremely important. Kosovo has a great renewable energy potential - biomass and biowaste products are underutilized, and biomass/biogas is hardly even produced. This activity has the potential to be an important energy player therefore it needs to be supported by the government as it has a great multiplier effect in the local economy as well.

Best Practices - Examples

In the following, best practices and cases are described from countries that are making large progress toward decarbonising the heating sector. These practices and cases can serve as a guide to tackle the challenges that Kosovo currently faces and provide sustainable heating solutions for its citizens.

The main mechanisms that are used to provide sustainable heating solutions can be divided into these instruments: *financial mechanisms - incentive programs, tax policy, raising awareness, standards for combustion appliances, bans and restrictions of solid fuel use, and minimum requirement standards* [7][8]. It is worth mentioning that countries that are applying these mechanisms have supported only energy technologies that are sustainable and provide high energy efficiency. The supported sustainable energy technologies are: HPs, boilers and appliances with high efficiency, thermal solar systems, and retrofitting of buildings amongst others. Below are described practices followed by their implementation.

[3] ERO - Renewable Energy Capacities Permits - Final Authorization - Biomass: https://www.ero-ks.org/zrre/sites/default/files/Publikimet/BRE/09.02.2021%20Regjistri%20i%20Aplikuesve%20p%C3%ABr%20Autorizim%20dhe%20Pranim%20ne%20Skemen%20Mbe....pdf

Financial mechanism

through financial mechanisms the citizens receive a certain amount or full financial support. It is the most common mechanism that most countries have applied to provide and incentivize the use of sustainable heating appliances and energy efficiency measures for households. Countries such as France, Ireland and Czhech Republic have been using financial mechanisms. In France, MaPrimeRénov' is a state aid program to finance projects in building renovations and heating.

The scheme is scaled in four categories based on income amount (first category lower income, fourth category higher income) and everyone is eligible to apply. The amount of the subsidy depends on the category of the applicant and the potential of energy savings. The scheme covers 23-90% of total costs [9]. In Ireland, through "Free Home Energy Upgrade", provides 100% financial support for people in assistance for retrofitting and new heating systems [16]. Czech Republic, through the "New Green Savings Program", has been subsidizing households to decrease energy consumption and lower greenhouse emissions. The subsidy covers up to 50% of expenditures needed, depending on the type of implemented measures. Also North Macedonia has provided financial mechanisms to their citizens to subsidize the purchase of HPs. The value of the project was 10 million euro where ten thousand households have benefited by 1000 euro to support the purchase of their HPs [10].

Tax policy

are policy instruments that governments use to incentivize the use of a certain product or service. France has been using a tax deduction policy through the program, 'Le crédit d'impôt pour la transition énergétique', CITE. A deduction up to 30% of income taxes was provided to citizens who changed their older appliances to new and high energy efficient ones [11]. Moreover, there are also different policy taxes that might be used such as: carbon and fuel taxes on the use of fossil fuels, and tax exemptions for appliances or services that provide reduction of emissions [7].

Awareness raising

consist of a crucial mechanism on changing citizens behaviors regarding their energy use and approach toward cleaner energy solutions. "Let's Live Warmer" a program established by the government of Latvia has marked large success. The objective of the program is to raise awareness on the importance of sustainable houses and investing in energy efficiency measures. They do so by providing information about high energy efficient appliances, financing instruments for investments, educating citizens and other stakeholders about saving energy. The program has achieved to save around 240 GWh and 25 thousand tons of CO2 [12].

Bans and restrictions

bans and restrictions incentivize the use of more sustainable heating solutions. Ireland has been using the practice to ban and restrict the use of bituminous coal for households. The restriction of sale, distribution and use of bituminous coal started in 1990, Dublin through legislative acts of the Air Pollution Act, 1987, then was extended for the other cities of Ireland through the other legislative acts of 2015 and 2020.

Recommendations

1.

Economic incentives for energy efficiency measures and sustainable fuels and technologies

the most sustainable and cheapest energy is the one that is not produced. Therefore, energy efficiency, without a doubt, is the primary fuel and objective that we should pursue. This is done by following two paths. The first one is by retrofitting houses and buildings. By having better insulations, we not only reduce the heating consumption but also the need for cooling during the summer. In addition, the comfort of citizens increases and the need for electricity consumption decreases. The second path is by providing subsidies for high energy efficiency heating appliances such as stoves and boilers. For the former, wood or pellet stoves with high energy efficiency, and the latter advanced boilers, which could be wood, pellet or electric.

In particular, technologies such as HPs and solar thermal should be incentivised as well. Biomass such as pellet and wood chips, take a crucial place as sustainable fuels that should be used as a primary fuel such as biomass. For that, these sources should be incentivised and promoted until they reach a maturity in the market. Other options such as wood logs, should be inspected. Due to illegal cutting, wood logs cost much cheaper than other biomass sources. The benefits of these measures will lead to: less and smart use of primary energy sources, decrease in energy demand, lower operation costs, and the most important one is the reduction of greenhouse emissions and improvement of air quality and health in general.

2.

Awareness raising

behaviour of the citizens (including households, services, commercials, and industries) plays a crucial role toward decarbonisation. For that, special programs should be established, where the citizens can be informed about their energy consumption and what kind of measures they can take. For example, the proper use of equipment plays a significant role. According to a Swiss study, the good use of stoves can save up to 100 times emissions levels [13].

Furthermore, citizens should know what kind of investments they should make. What kind of appliances should they buy? Not every appliance is convenient for all citizens (it depends on economic activity or urban location of the building or house). Or is it better to buy a new heating appliance or retrofit? Lastly, the citizens, businesses and all stakeholders involved should be aware of funding opportunities as well.

There are already programs that are funded by international financial institutions such as GEFF, where households that invest in energy efficiency measures and green technologies can profit an amount of 20% grant from total investments. Therefore, awareness raising programs that would inform and assist citizens to make the best decision through these programs, will incentivise citizens to make the right changes and investments needed and contribute toward decarbonisation.

[4] Bituminous coal is a low-quality coal type

The decarbonisation of the heating sector should be pursued based on the current state that already exists. For that three considerations should be taken into account. First, Kosovo is a developing country with low incomes. Second, the high dependency on biomass and electricity. And third, the low penetration of DH. On the other hand, considering that decarbonisation is our destination, the following recommendations that we should pursue to decarbonise the heating sector are:

3.

Standards and labellings

the government should proceed with the transposition of the EU directive 2009/125/EC for eco-design and labelling of heating appliances based on energetic performance as well. In addition, since Kosovo has signed the Stabilization and Association Agreement (SAA), it has an obligation to transpose these directives. Standards will serve to establish the minimum requirements, while labelling will shift the behaviour of public authorities and citizens toward more efficient and cleaner use of heating technologies.

4.

Sector-coupling (heat-electricity)

with the decarbonisation of energy systems, electrification of the heating sector through HPs is seen as a prominent solution toward a clean heating sector. Therefore, the government should take into account this new paradigm and start preparation for the electrification of the heating sector as well, by providing the adequate grid infrastructure and removing the barriers for prosumers.

5.

Extension of existing district heating

The existing district heating system can be extended particularly in Prishtina, where half of the potential is still untapped. This would create benefits to the local population living in Prishtina, improving the health situation there as well as improving the opportunity cost to society. This is true also for Gjakova, where the capacity of the DH can be extended. Furthermore the two plants in North Mitrovica and Zvecan require more investments and need to be moved towards eco-friendly fuels.

6.

Penetration of district heating with renewable energy sources

n the absence of the heating grid infrastructure, its planning should be by putting in the center the use of renewable energy sources such as biomass and waste heat in combination with HPs. The best example to be followed is the Gjakova District Heating plant that uses co-generation from biomass as a fuel for heat and electricity production. This can be replicated in other cities as well, particularly those that are smaller in size and have a large focus in agriculture. While the financing for them could be secured from low interest loans from international financial institutions.

[5] Green Economy Financing Facility

Conclusion

Without a doubt, the path toward decarbonisation of the heating sector will be a challenging one, especially, if no actions will be taken, the environmental and health situation will only get worse. While the heating sector in Kosovo continues with a no clear path and no incentives for citizens to use more sustainable heating solutions, the path toward a clean heating sector looks far away.

Prioritization of a sustainable energy agenda that includes all the sectors, including the emerging of new paradigms, such as sector-coupling (power-heat), a combination of best practices starting from incentivizing energy efficiency measures and low-carbon technologies (PV, HPs, high energy efficient appliances), retrofitting, eco-design standards, taxes and bans will definitely lead toward a future with a clean heating sector.

Countries such as Sweden [14] have shown that even in countries where fossil fuels have been used as the main source for heating, it is possible to decarbonize the heating sector. And this is accomplished through supportive policies and financial mechanisms that promote energy efficiency measures and clean heating technologies, promote sustainable DH, and empower citizens to make sustainable solutions through raising awareness programs.

There should be no dilemma standing in front of us: We should not follow the same old paradigm but we should become courageous and pave the path towards decarbonising the heating sector and become one of the pioneers in the energy transition.

Key Statistics - Infographic

Electricity and biomass are the main sources used by citizens for heating.

56%

Biomass represents 56% of total energy consumption for households.

4

In Kosovo there are 4 districts for heating (central heating - DH).

5%

Only 5% of heat consumption is covered by district heating (central heating - DH).

60%

The rate of biomass consumption continues to grow. The use of biomass has increased by 60% compared to 2012 and 2020.

40%

Over 40% of households can not keep their dwelling warm adequately - Values in 2018

20%

22% of households in Kosovo have problems (with leaking roofs, walls, floors, wet foundations, window frames and rotten floors) with their homes. Whereas, this figure goes to 25% for rural areas

"Heating Strategy of the Republic of Kosovo 2011 - 2018" is the latest document dedicated to the heating sector of Kosovo.

References

[1] National Energy Efficiency Action Plan 2019-2021, pg. 7

[2] Energy Community, 2021, Kosovo Annual Implementation Report

[3] World Bank, 2017, Biomass-Based Heating in the Western Balkans – A Roadmap for Sustainable Development

[4] Energy Community, 2020, Kosovo Annual Implementation Report

[5] Energy Efficiency Council, 2021, Accessed on: November, 2021: https://www.eec.org.au/for-energy-users/technologies-2/heat-pumps

[6] Agjencia e Statistikave të Kosovës, 2018, Përballueshmëria e ekonomive familjare për të mbajtur shtëpinë të ngrohtë në mënyrë adekuate, Accessed on: November 2021: https://askdata.rks-gov.net/PXWeb/pxweb/sq/askdata/askdata__Anketa%20mbi%20t%c3%ab%20Ardhurat%20dhe%20Kushtet%20e%20Jetes%c3%abs/silc10.px/?rxid=ade3a4da-b974-453d-88e2-be13bf1a34a5

[7] Inter-American Development Bank, 2012, The Role o f Green Fiscal Mechanisms in Developing Countries: Lessons Learned, Accessed on: October, 2021: https://publications.iadb.org/publications/english/document/The-Role-of-Green-Fiscal-Mechanisms-in-Developing-Countries-Lessons-Learned-Case-Study.pdf

[8] Odyssee-Mure, Successful Energy Efficiency Measures, Accessed on: November, 2021: https://www.measures.odyssee-mure.eu/successful-efficiency-measures-tool.html#/results

[9] MaPrimeRénov', 2021, Les nouveautés de MaPrimeRénov', Accessed on: October, 2021: https://www.ecologie.gouv.fr/sites/default/files/19164_maPrimeRenov_DP_Janvier%202021.pdf

[10] Balkan Green Energy News, North Macedonia's ESM to subsidize purchase of inverter air conditioners with EUR 10 million, Accessed on: November, 2021: https://balkangreenenergynews.com/north-macedonias-esm-to-subsidize-purchase-of-inverter-air-conditioners-with-eur-10-million/

[11] Bridging European and Local Climate Action, 2018, The Energy Transition TAX Credit (CITE) in France, Accessed on: September, 2021: https://www.euki.de/wp-content/uploads/2019/09/20180827_-FR_CITE_Study.pdf

[12] Ministry of Economics, Republic of Latvia, "Let's Live Warmer", Accessed on: October, 2021: https://www.em.gov.lv/en/lets-live-warmer

[13] Clean Heat EU, Residential wood burning Environmental Impact and Sustainable Solutions, Accessed on: November, 2021: https://www.clean-heat.eu/en/actions/info-material/download/background-paper-residential-wood-burning-3.html

[14] Swedish Energy Agency, Energiindikatorer 2013-Uppföljning av Sveriges energipolitiska mål, Energimyndigheten ER, 2013

[15] Energy Regulatory Office, Register of Applications for construction of new generating capacities and Admission to Support Scheme from RES. https://www.ero-ks.org/zrre/sites/default/files/Publikimet/BRE/09.02.2021%20Regjistri%20i%20Aplikuesve%20p%C3%ABr%20Autorizim%20dhe%20Pranim%20ne%20Skemen%20Mbe....pdf

[16] Sustainable Energy Authority of Ireland, Free Energy Upgrades, Accessed on November 2021: https://www.seai.ie/grants/home-energy-grants/free-upgrades-for-eligible-homes/