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AGJENCIONI PËR MBROJTJEN
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AIR POLLUTION IN KOSOVO

EXECUTIVE SUMMARY

Proposed measures and policy instruments to reduce pollution from key sectors

SUPPORTED BY:

NATUR VÅRDS VERKET
SWEDISH ENVIRONMENTAL PROTECTION AGENCY

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INTRODUCTION

The report “Air Pollution in Kosovo: proposed measures and policy instruments to reduce air pollution in key sectors” (hereafter referred to as the Report) is part of the project Environmental Capacity Building on Data Use in Kosovo, which aims to provide capacity building support to the Kosovo Environmental Protection Agency (KEPA) and the Ministry of Environment and Spatial Planning (MESPI) in Kosovo.

The purpose of the project is to facilitate Kosovo's preparation as a future EU Member State to comply with Directive 2016/2284/EU on the reduction of national emissions of certain atmospheric pollutants (National Emission Reduction Commitments Directive, NEC). To comply with this Directive, a Member State needs comprehensive air quality plans and emission reduction tools. A primary focus area in the project is to support the implementation of measures, policies, plans and routines to reduce air emissions through the use of analytical tools and will provide Kosovo with a better understanding of the key sectors where mitigation is most feasible and the policy instruments that could be used.

For these reasons, the Swedish Environmental Research Institute (IVL), in close cooperation with the Swedish EPA and the operational partner organisations in Kosovo (KEPA and Balkan Green Foundation (BGF), drafted this report. The Report includes a brief analysis of which sectors in Kosovo could most effectively reduce emissions of air pollutants and climate change emissions. The Report includes a cost-benefit analysis of individual proposed measures and future scenarios, where available. The analysis in the Report is carried out in the context of Kosovo's policy landscape and takes into account a range of policy instruments that can drive and facilitate the practical implementation of effective measures in the future.

This text is intended to be read as an executive summary of the main report.

METHOD, TOOLS, AND DATA SOURCES

The analysis within the feasibility study, Air pollution in Kosovo, summarised in the present report is based on several underlying data sources. To analyse **current** and **future sources of air pollution** in Kosovo and to select key pollutants and key emitting sectors, main information sources were the emission inventory, certain results of JICA project (as in JICA, 2021) and emissions modelled as outputs from the main analytical tool used within the study – integrated assessment model GAINS (Greenhouse Gas – Air Pollution Interactions and Synergies).

The modelled scenarios are based on a baseline, which is a level from which we start when measuring a change. A baseline does not start from the value zero, but from values corresponding to the benchmark. To obtain reliable and most up-to-date results from baseline scenario, certain modelling parameters were adjusted based on online consultations with national experts from KEPA, Balkan Green Foundation, and other organisations. Additional data was also provided by national experts via e-mail. As a result of the adjustments, we developed new, project-specific (adjusted) baseline scenario

Developing an adjusted baseline scenario and choosing key sectors

To limit the framework of the feasibility study, selected key pollutants and three key emitting sectors where selected. This was a joint work process conducted with KEPA, Balkan Foundation etc.

This step was followed by a comprehensive list of measures, which was used to set up to target emission reductions from three identified key emitting sectors. Subsequently, this step was followed by drafting a list of policy instruments that could stimulate implementation of those measures.
The gender perspective analysis was conducted by IVL based upon an initial assessment made by Tripleline. Several meetings were held between KEPA, BGF, Tripleline and the Swedish Environmental Protection Agency on possible ways to include gender aspects into this study during the first half of 2022.

During a later stage, based upon the initial analysis conducted via the GAINS model database and literature review, a short qualitative overview of available measures and policy instruments was conducted.

Initial analysis of emission trends

To date, there are few studies measuring national-level emissions of air pollutants in Kosovo. The Kosovo Emission Inventory update (2021) provides quite detailed numbers for one specific year, namely 2018. The World Bank (2019) analyses historical emissions and future trends based on the GAINS modelling results obtained by IIASA (International Institute for Applied Systems Analysis). The last historical year in this report is 2015. Since then, IIASA has updated the baseline scenario assumptions. For assessment of the emission trends in the current report the study uses the latest publicly available baseline scenario developed by IIASA – Baseline from the scenario group Clean Air Outlook 2. This scenario contains data on development until the year 2050, and the closest year describing the current (2023) situation is 2020.

Air pollutants available for analysis in the GAINS model are SO2, NOx, NH3, NMVOC and PM (different fractions). Figure 1 illustrates emission trends for PM2.5 according to the IIASA's baseline scenario.

In the Kosovo Emission Inventory update (2021) the category 1) "industry" includes industrial processes, industrial combustion, and heat and power generation; 2) "small combustion" means residential combustion.

Most part of current PM2.5 emissions occur in the residential combustion sector. Industrial emissions as well as emissions from power and heating plants are also significant. Total emissions are expected to decrease after 2020, especially in the residential sector, see figure 1 below.

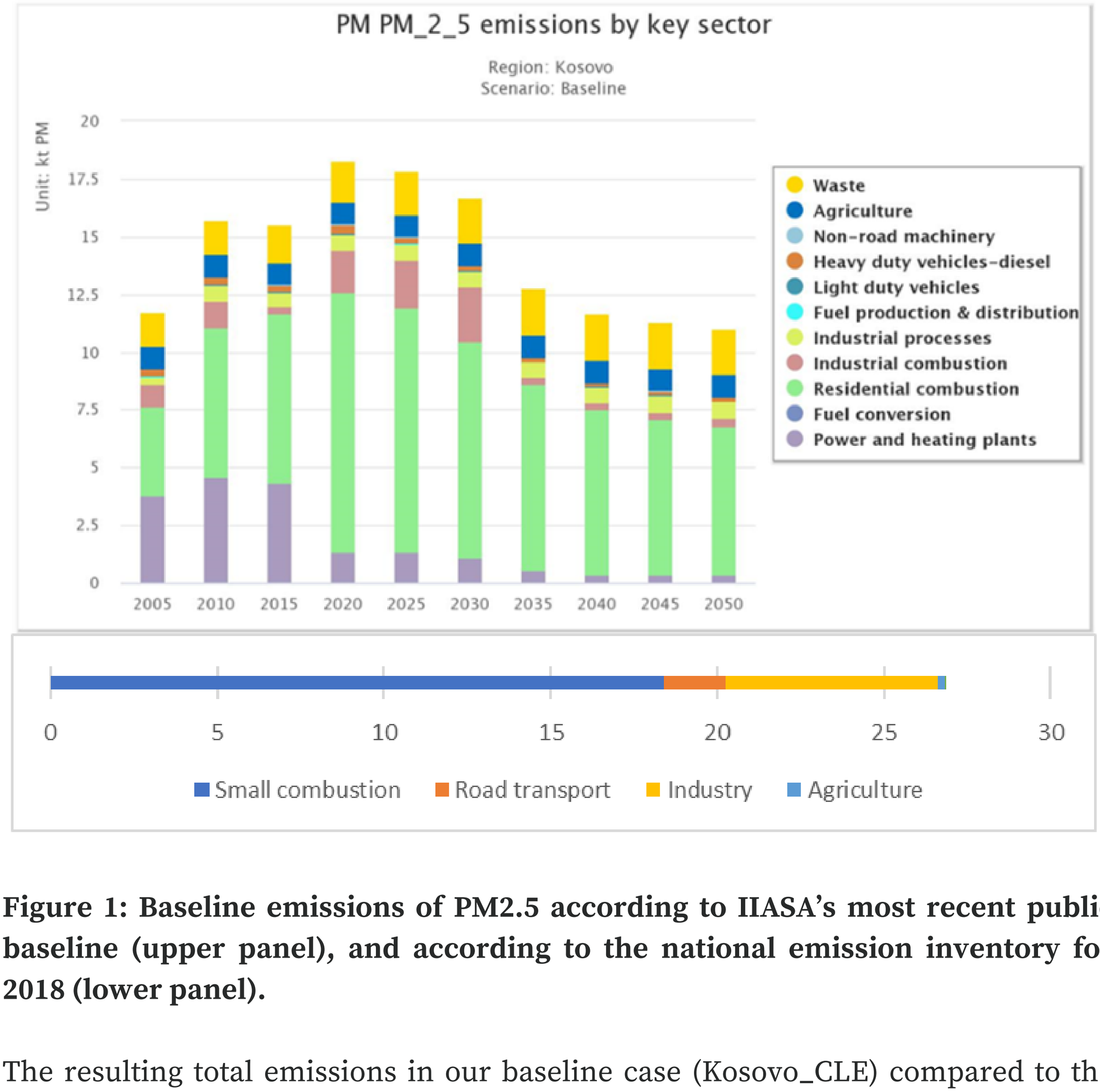


Figure 1: Baseline emissions of PM2.5 according to IIASA's most recent public baseline (upper panel), and according to the national emission inventory for 2018 (lower panel).

The resulting total emissions in our baseline case (Kosovo_CLE) compared to the IIASA's initial baseline emissions are illustrated in the figure 2 below for the four major pollutants – SO2, NOx, PM2.5 and NMVOC.

The main differences can be seen for year 2020 for SO2 and NOx. The SO2 and NOx emissions are much higher in Kosovo_CLE since IIASA assumed NOx and SOx abatement at lignite power plants already by 2020, which has not been implemented. In the baseline scenario, NOx abatement is supposed to be in place by 2030, while for SOx no abatement is assumed to be installed in the near future (by 2030). As for PM2.5 small reductions are expected in 2030 for the baseline case (Kosovo_CLE), where the trends display a reduction from 16,7 to 15,2 kt. For NMVOC, a similar trend can be seen, where the baseline case (Kosovo_CLE) in 2030 is expected to decline from 33 to 31 kt.

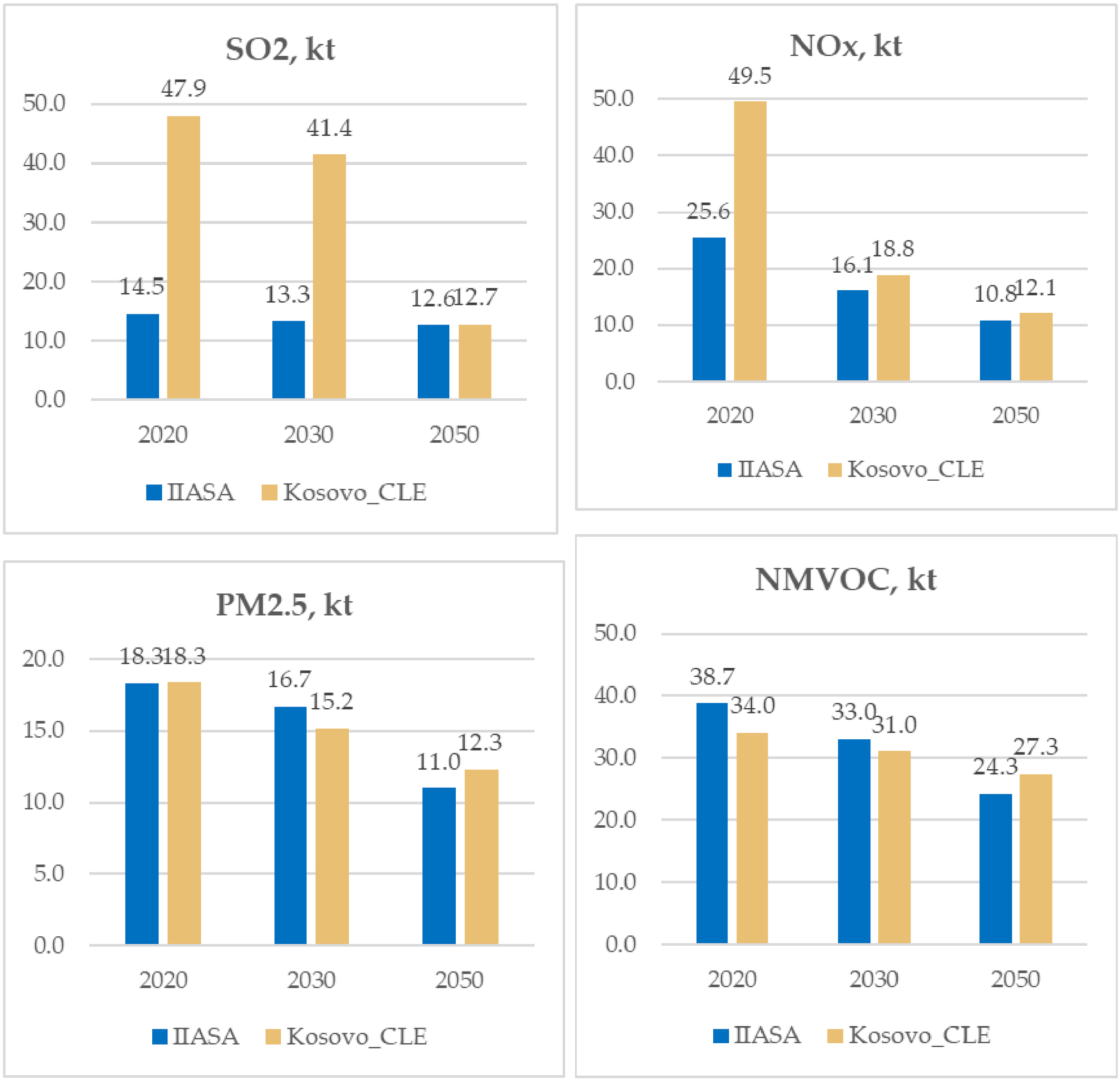


Figure 2: Baseline emissions of the main pollutants: IIASA vs. Kosovo_CLE.

KEY SECTORS AND POLLUTANTS

Once the initial analysis was completed by making use of the assessment presented above, and in cooperation with national experts, for further detailed analysis. Three key emitting sectors relevant for further analysis were selected, and is proposed by IVL Swedish Environmental Research Institute to be of main focus for Kosovo to reduce its emissions across the following key sectors:

- Residential wood combustion
- Diesel road transport
- Heat and power generation

The air pollutants that are of interest are PM2.5, NOx, SO2 and NMVOC.

Residential wood combustion

Most wood heating stoves are conventional, 5 percent are so called “improved” appliances (corresponding to the category “advanced” in the EMEP, 2019), and about nine percent of the stoves are fuelled with pellets (Kosovo Emission Inventory update, 2021). There is thus significant potential for emission reductions from burning wood by gradual renewal of the appliances stock. Shift from wood combustion to renewable energy sources (solar panels, heat pumps) and development of central heating network represent further emission reduction potential in the residential sector of Kosovo.

Diesel road transport

Kosovo’s road transport is mainly fuelled by diesel with 86 percent, and gasoline accounts for 13 percent and a certain number of passenger cars running on LPG (Republic of Kosovo, Ministry of Finance, Labor and Transfers, 2021; JICA 2021). The energy balance 2020 does not consider the electrical cars that are present in the country.

Diesel road transport accounts for a large part of the country’s total NOx emissions. Emissions from road transport was calculated using traffic measurements on national roads conducted by the Ministry of Infrastructure and vehicle register data. Other important air pollutants from this sector are PM2.5 and NMVOC.

According to official transport statistics in Kosovo an increased share of registered motor and non-motor vehicles can be seen over the period 2011-2021. From 2020 to 2021, an increase of 11.4 percent can be seen (Kosovo Agency of Statistics, 2022). The average age of vehicles is over 18 years (Balkan Green Foundation, 2019). The inhabitants tend to buy used vehicles, as it is less costly compared to a new. This results in a large share of vehicles with poor emission control in the Kosovo’s total vehicle fleet – 14 percent of passenger cars lack control at all, and for heavy trucks this share is 26 percent. Most vehicles in both categories are of Euro 3, and the share of Euro 6 is very small – 2-3 percent (JICA, 2021; personal communication with KEPA).

Figure 3 illustrates energy use by diesel transport (unit PJ) and here it can be seen that passenger cars accounts for 10.4 PJ, followed by heavy duty trucks with 2.5 PJ, heavy duty buses accounts for 1.3 PJ and light duty vehicles is estimated to 0.6 PJ.

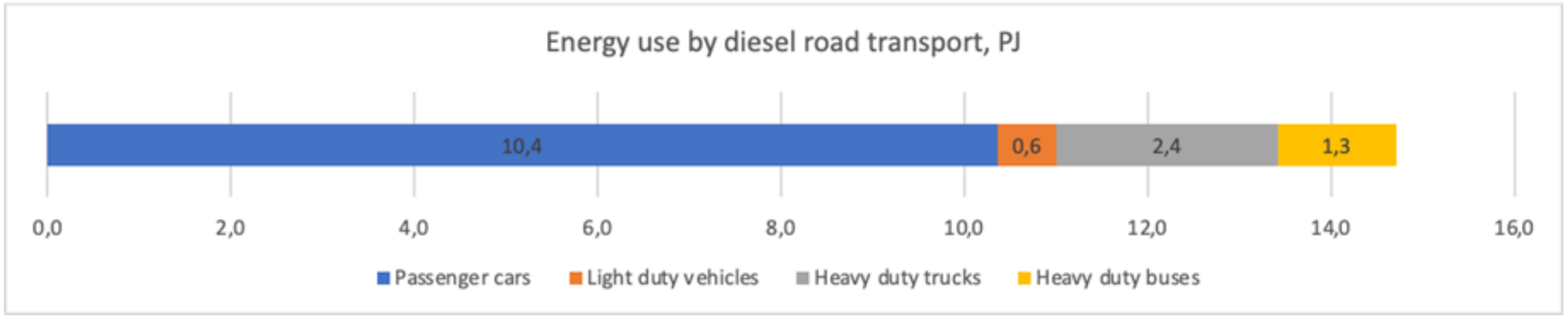


Figure 3: Energy use by diesel road transport, PJ.

A great potential can be seen by reducing the emissions from Kosovo's diesel vehicles by gradual renewal of its national vehicle fleet and shift to electric vehicles

Heat and power generation

Kosovo has two coal-fired powerplants that are operated by Kosovo Energy Corporation (KEK). These two powerplants Kosova A and Kosova B are the main source for air pollutants. The corresponding emissions from both power plants are displayed in the figure 4 below. SOX accounts for 40.2 Kt, NOX with 36.8 kt and PM2.5 with 3.5 kt.

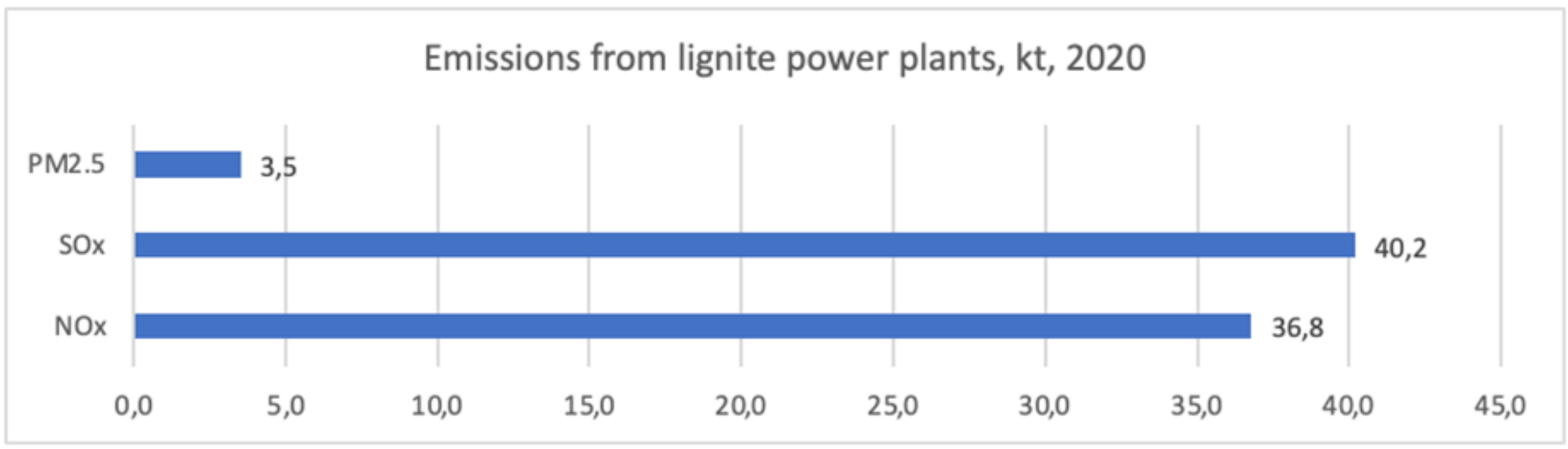


Figure 4: Emissions from lignite power plants, Kt, 2020.

SCENARIOS FOR KOSOVO 2030, 2050

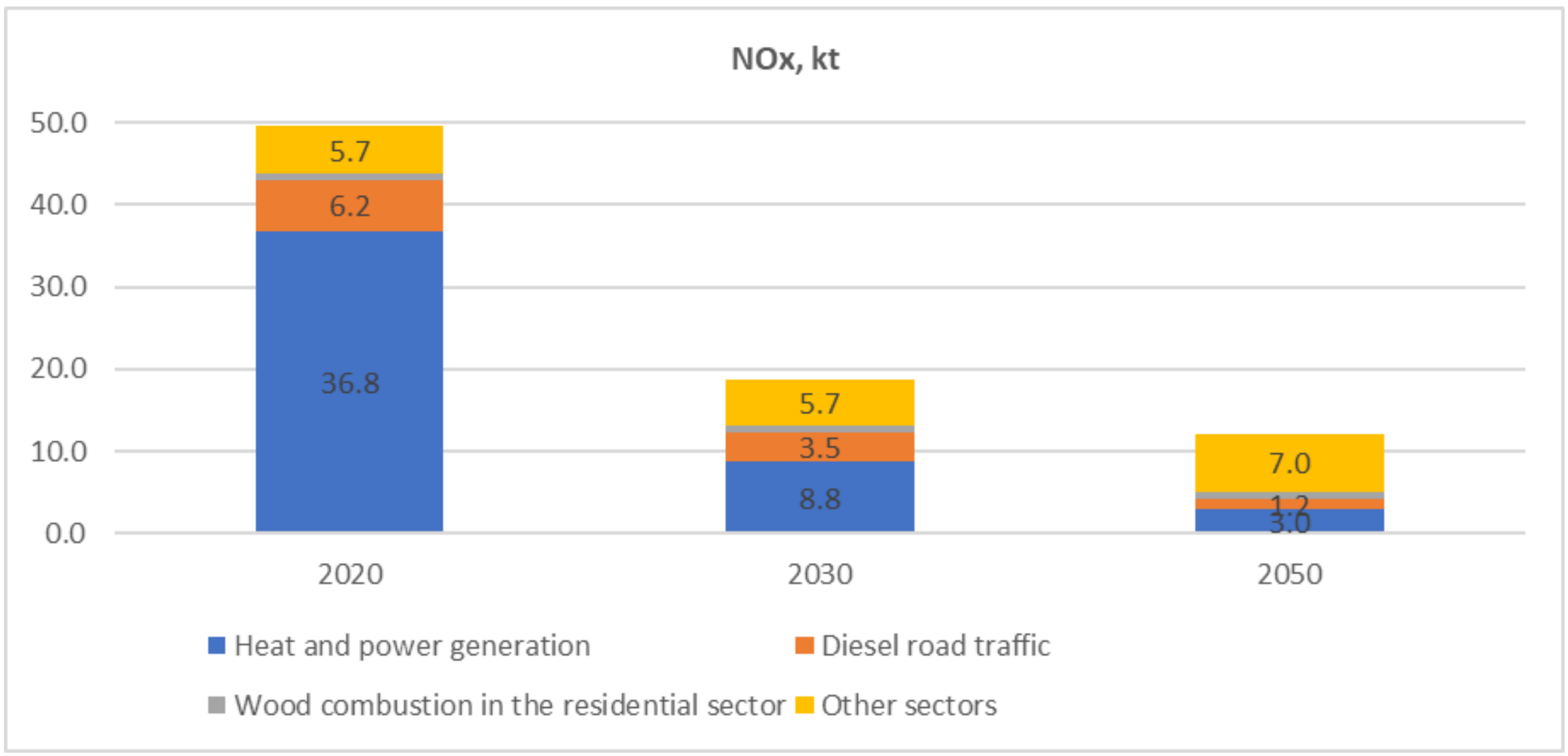
By making use of baseline data from IIASA (International Institute for Applied Systems Analysis), a modelling tool by GAINS have been used to develop several scenarios in terms of the state of play of Kosovo's Air Pollution in year 2030 and 2050.

Baseline

The baseline scenario describes the development of activities under the assumption that the current legislation is implemented, and no further actions are taken to reduce emissions – denoted as a 'business as usual' scenario. The baseline scenarios across key sectors are one of the main outcomes of this project.

The baseline emission trends across the key sectors are shown in figure 5 below. Emissions are expected to decline across all key sectors in the study, due to several technological shifts such as better abatement technologies at lignite power plants, reconstruction plans to build a new Kosova plant, gradual replacement of appliances in the residential sector, and vehicles within the transport sector. The expected increase in other sectors is related to an expected increase in industrial activities. However, these emissions are not of focus in this analysis.

Annual technical costs of new equipment in Kosovo are expected to increase from 132 million Euro in 2020 to 213 million Euro in 2030, corresponding to a 62 percent increase. Looking at the scenarios for year 2050, the increase is 145 percent and annual technical costs of new equipment accounts to 322 million Euro. However, these amounts do not include expenses related to structural changes such as fuel shifts.



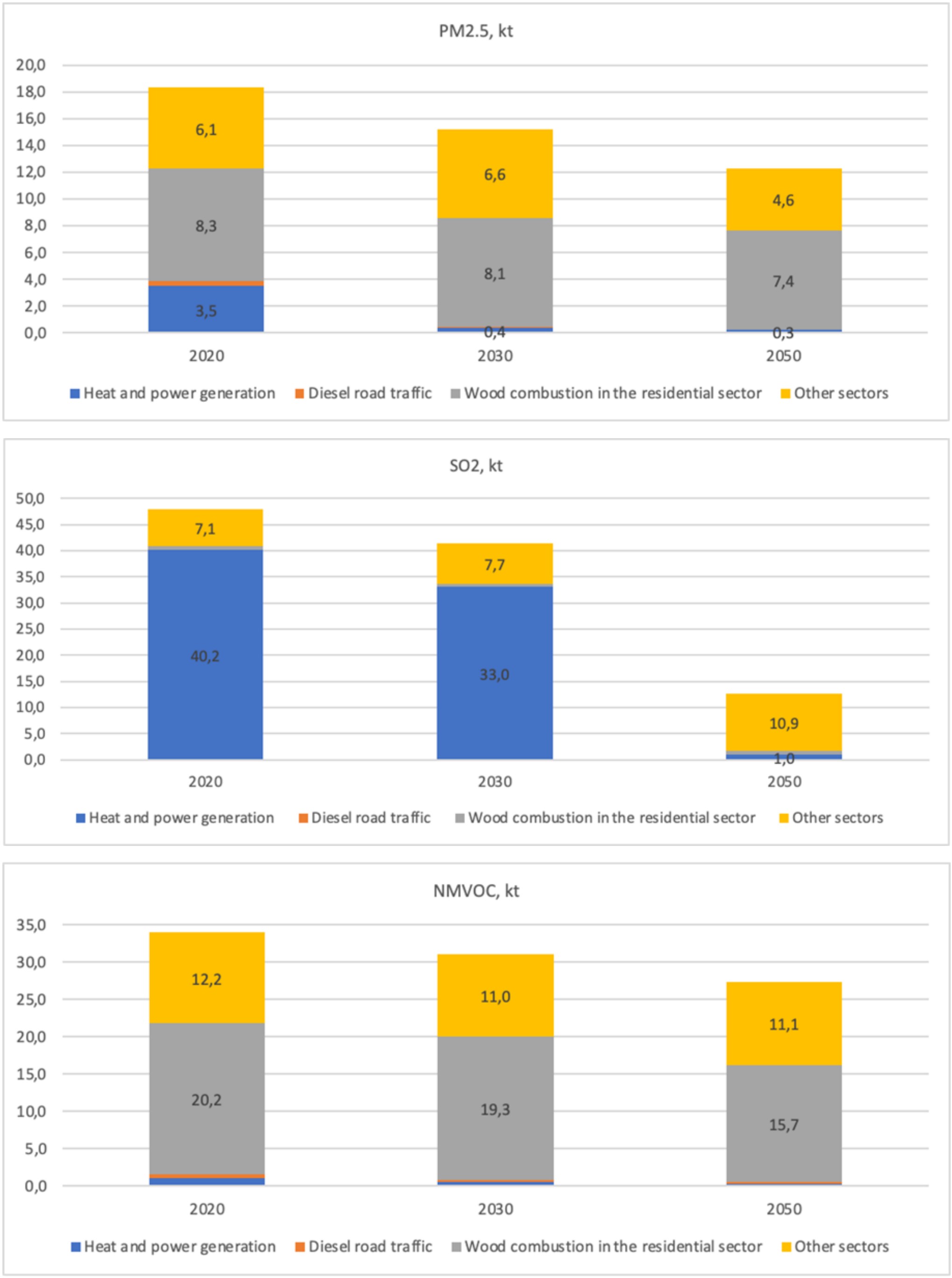


Figure 5: Baseline emissions across the key sectors in Kosovo_CLE.

Scenarios with additional measures

Four scenarios have been developed with proposed measures in the three key sectors beyond measures implied by current legislation:

- **Low** (low ambition level regarding emission reductions)
- **Mid** (medium ambition level regarding emission reductions)
- **MTFR** (maximum technically feasible reduction) – the most ambitions scenario with technical measures only (no fuel shifts included)
- **Green** – scenarios with replacement of fuel combustion with non-emissive energy sources

It should be noted that these four scenarios, across different levels of ambitions do not indicate the practical feasibility of implementing the proposed measures.

Figure 6 below illustrates reductions of health-related damage, compared to the baseline. The analysis shows that the benefits for Kosovo in the year 2030, range between 166 million Euro with the Low scenario to 414 million Euro with the Green scenario. Once mortality figures across all of Europe is incorporated within the model, the results range from 889 million Euro to 1843 million Euro. In 2050, the comparative damage reductions in the considered scenarios are lower due to many of emission reduction measures are already included in the baseline scenario.

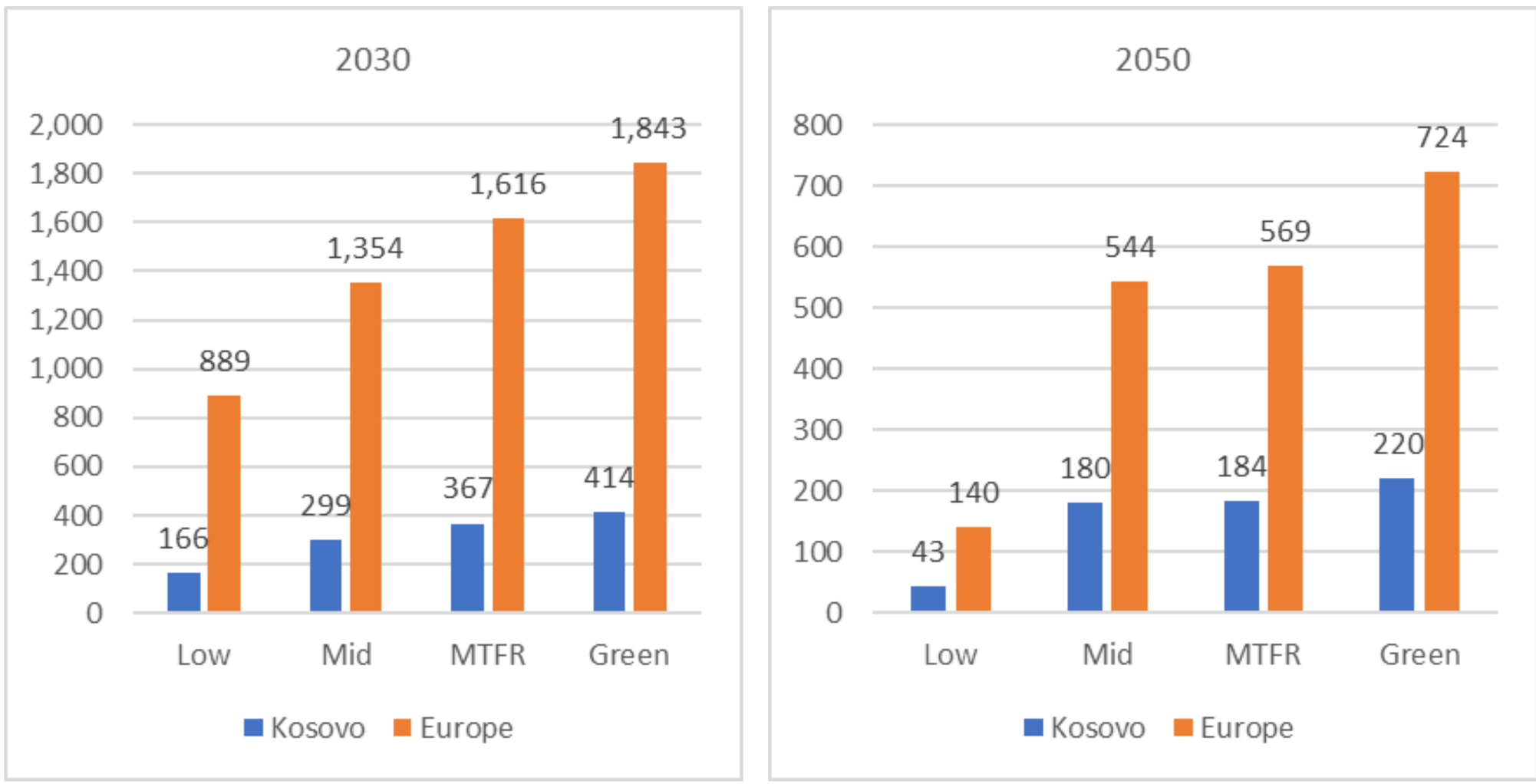


Figure 6: Scenario-specific reductions of health-related damage in Kosovo and entire Europe, million Euro2015.

Table 1 illustrates that by year 2030, the most expensive measures are measures within the residential wood combustion sector. It concerns the replacement of wood heating stoves with pellet stoves equipped with Electrostatic Precipitator (ESP).

Table 1: Overview of total costs for abatement of emissions across different scenarios in 2030 (million Euro2015)

Year 2030/Sector	Type of costs	CLE (baseline)	Low	Mid	MTFR
Residential wood combustion	Technical measures	51	41	117	460
Diesel road transport	Technical measures	118	121	105	139
Heat and power generation	Technical measures, large lignite plants	35	77	97	118

Note: Abatement costs are only estimated for measures that are included within the GAINS model.

MEASURE INSTRUMENT TOOLBOX FOR KEY SECTORS

The results from the GAINS baseline indicated the key sectors; Residential wood combustion, Heat and power generation and Diesel Road transport and related pollutants NOX, SO, NMVOC and PM2.5 should be further analysed for Kosovo. This chapter outlines proposed measures relevant for emission reduction in these three key emitting sectors in Kosovo, including quantified analysis of certain measures (See table 2 below) with assessments of current emission reduction potentials, technical abatement costs, and health-related benefits.

Measuring the impact of air quality in three sectors

Proposed measures or indicators of the impact of air quality and instruments to collect and analyze data have been identified for three key sectors in Kosovo:

- Residential wood combustion
- Heat and power generation
- Diesel road transport

For each of the three key sectors, possible scenarios for 2030 and 2050 were discussed in the previous chapter. Based upon these scenarios, proposed measures are discussed within this section.

The measures or indicators selected for further analysis are presented in the table below. See table 2 - Matrix overview of key sector and related policy instruments.

Table 2: Overview of key sectors and related measures

KEY SECTORS ⇓	• MEASURES ⇓
Residential wood combustion	•Enhanced replacement of conventional stoves with advanced and new stoves, or pellet stoves •Retrofit ESP on existing stoves •"Right burning" practices •Energy efficiency improvements in buildings •Reduced burning in urban areas •Replacement of fuelwood stoves with non-emissive heating technologies
Diesel road transport	•Replacement with newer Euro standards •Less emitting fuels •Retrofitting with particle filters •Proper inspection and maintenance •Reduced diesel transport •Modal shift •Replacement of diesel with other fuels
Heat and power generation	•Emission control technologies at large power plants •Shift from lignite to gas or non-emissive energy generation technologies •Energy efficiency improvements at large combustion plants •Extension of district heating systems

Measures – Emission reduction potentials, costs, and benefits

Emission reduction potential is estimated by extending the current implementation rate of a measure (see description of the current situation in chapter 2 of the main report) to the maximum possible implementation rate – typically 100 percent[1]. Emission reduction potential is basically a gap between the current emission level and the minimum emission level reached by maximum implementation of a measure. Reaching the emission reduction potential is usually too expensive and thus not realistic – in real life, a combination of measures is applied rather than one measure to 100 percent.[1] However, estimates of emission reduction potentials and costs (external as well as technical, or abatement costs) with this method give an understanding of maximum possible reduction that can be reached with each measure, and whether it is cost-effective in terms of avoiding health damage.

Health benefits of each measure are calculated as difference between the current health damage and the damage in case the measure is applied to 100 percent of activity. Effects included in quantification of health damage are premature mortality due to exposure to PM2.5 and ozone; for monetary valuation of damage, we use metric called VSL assumed to equal 3.6 million Euro2015 (see Chapter 1.3 in the main report). Health benefits are assessed for Kosovo and for the entire European domain to include trans-boundary effects of emission reductions.

Technical (abatement) costs are only estimated for measures included in the GAINS model (see Annex 1 of the main report for all details), while for other measures, technical costs are not available, and cost-benefit-assessment (CBA) is not conducted.

Resulting emissions for different measures might be presented on different aggregation levels, depending on the effect of a measure – e.g., congestion tax affects not only diesel vehicles but all personal cars in a considered area; ban on burning wood also concerns all types of appliances and not only heating stoves. **Emission aggregation level** for each measure is specified either in text or in the titles of figures illustrating emissions.

[1] This is done by changing the application rate of a measure in the GAINS model's control strategy for a considered scenario – in this case, the current legislation (CLE) scenario.

The analysed measures indicate the avoided health damage due to the full implementation of these measures are not all cost-effective. For example, for some measures, technical costs are significantly higher than avoided damage (health benefits) making them not cost-effective. The analysis finds that cost-effectiveness, depends on the choice of the considered domain. Once inhabitants of other neighbouring countries than Kosovo are included, the measures become cost-effective. The study finds that the positive effects in Kosovo alone vary from 13 percent to 36 percent of the avoided health damage, depending on what pollutants are reduced by a specific measure. Abatement costs are only estimated for measures what are included within the GAINS model.

Since PM2.5 are not transported the same long distances as SO2 and especially NOx, implies that the decision-making processes regarding what measures to take to reduce emissions in a country, has a large effect on the avoided health damage in neighbouring countries.

The analysis has examined damage costs of air pollutants in Kosovo, by connecting specific pollutants emitted with health problems they cause and with corresponding monetary values of health damage. The modelling tool provides possibilities of only reductions when one pollutant is affecting the premature mortality. Within this analysis, several such measures are considered.

The table 3 below presents an overview of external costs – estimated costs of health damage resulting from emissions in Kosovo – depending on the considered domain and pollutant. These costs do not depend on measures considered, but on the structure of the population, current levels of emissions and the exposure to air pollution. Also, geographical location and meteorological conditions affecting transboundary pollution is an important aspect. The results illustrate that reducing one kilogram of PM2.5 emissions in Kosovo would bring significantly larger health benefits than reducing one kilogram of SO2 or NOx, and that for NOx and SO2, trans-boundary pollution is much more significant than for PM2.5.

Table 3: Overview of damage costs of air pollutant emissions in Kosovo, Euro2015/kg pollutant.

Pollutant	**PM2.5**	**SO2**	**NOx**
Effects in Kosovo	24.8	5.0	1.0
Effects in Europe	68.4	31.1	7.0

The choice of measures needs to be decided upon priority for Kosovo. Often a wide range of measures must be implemented across different sectors. If cost-effectiveness is prioritised, instalment of High Efficiency Deduster (HED) in existing power plants is the best option. On the other hand, if avoided damage is prioritized, a switch to non-emissive technologies within heat and power generation or shifting from lignite to gas (less damaging to public health, but still emissive) is the best option. Finally, if decision-makers prioritize largest possible emission reduction for PM2.5 an extension of cogeneration of combined heat and power (CHP) within the heat and power generation sector would be the best option.

POLICY INSTRUMENTS RELEVANT FOR SCENARIOS

This report distinguishes between proposed measures and policy instruments and consider policy instruments as driving forcers to implement measures. In Annex 5 of the main report, measures, and instruments relevant for the key sectors are presented as matrixes illustrating a 'measure-instrument toolbox' for each key sector, where each measure is linked to one or several policy instruments and vice versa.

Several of relevant policy instruments are of legal character. Kosovo's national environmental legislation is currently not in full compliance with the relevant EU legislation. The status of harmonization of Kosovo's legislation for the three key sectors with relevant EU Directives is summarised in Annex 8 the main report – Air Pollution in Kosovo. The information here displays that several national legislations that have not yet been transposed according to various EU legislations such as eco-design directive, renewable energy directive etc. Possible solutions might be better harmonization with the EU legislation by drafting enforcement legislative acts and appointing responsibilities.

Table 4 below show one policy instrument per key sector and per options LOW – MID or GREEN. The previous sections included a Maximum technically feasible reduction (MTFR) scenario. The MTFR scenario corresponds to a hypothetical situation. It that implies that all technical measures are set to maximum implementation rates, which is a rather unrealistic scenario. Hence, it cannot be used for guidance on specific policy recommendations. Therefore, the recommended policy actions listed in this section has excluded the MTFR scenario.

Table 4: Matrix overview of key sector and related policy instruments

	LOW	MID	GREEN
Key sector	**Policy instrument**	**Policy instrument**	**Policy instrument**
Small-scale wood combustion	Investment support and tax reductions for energy efficiency measures in the building sector	Financial support to install retrofit ESP on existing stoves	Economic incentives for switch to solar panels and heat pumps
Heat and power generation	Taxes and refundable charges on emissions of air pollutants (SO_2, NOx)	District heating policy instruments	Tax on fossil fuels
Diesel road transport	Low emission zones in 4 large cities	Vehicle replacement programs	Subsidies/tax reduction for import of electric/hybrid cars

IMPROVED AIR QUALITY FROM A GENDER AND SOCIAL INCLUSION PERSPECTIVE

Finally, the study briefly discussed aspects related to improved air quality from a gender and social inclusion perspective. Women are in most cases the primary users of household energy, thus suffer more from indoor particulate matter, unsafe water resources as well as sanitation. In all three key sectors, taxes are suggested as a policy instrument. The gender analysis proposes that policy and decision makers should consider three main issues when it comes to implementing an environmental tax in Kosovo:

- The gender implication of the tax measure itself
- Gender implications of the tax policy package
- The gender implications of the outcome of the tax
-

Improvement of stoves are likely to bring positive benefits for women, as housekeeping is still often considered a women's domain. By providing targeted support to the installation of retrofit ESP it can give positive gender aspects within the **residential wood combustion** sector.

Imposing a tax on fossil fuel are likely to directly affect women due to income disparities between men and their socio-economic status. One suggestion is that any low-income tax credit could be increased in line with the tax rate to offset distributional impacts during the life of the tax. Another aspect within the **heat and power generation** sector relates to considering how any extra revenue, such as taxes and refundable charges on emissions is reinvested, and particular may benefit women.

Subsidies or tax reductions targeted import of electric or hybrid cars needs to be well-targeted, as households and individuals with higher incomes and a good financial situation can buy an electric or hybrid car without any subsidy or tax reduction. The study proposes increased subsidies that are targeted low-income households, which are mainly represented by women.

DISCUSSION AND CONCLUSIONS

The analysis finds that the three key emitting source areas are related to diesel road transport, wood heating stoves in the residential sector, and large lignite power plants. These sources are responsible for major part of NOx, PM, SO2 and NMVOC. In year 2020 and 2030, emission reduction potential in Kosovo seems to be high. By replacing technical measures such as end-of-pipe NOx and SOx abatement technologies at power plants, newer Euro standards and replacement of stoves – substantial emission reductions can be obtained in the near future.

This study has developed three scenarios which describes different levels of ambition in terms of reaching the entire "technical" emission reduction potential (Low, Mid and MTFR scenarios). Additionally, there is one scenario going beyond **MTFR** and considering shifts from fuel combustion to non-emissive energy sources in the key emitting sectors (Green scenario). The total emission reduction potentials and corresponding health-related benefits in year 2030 are summarised in Table 5.

Table 5: Emission reduction potentials and health-related benefits in Kosovo in different development scenarios, compared to baseline, year 2030.

Scenario	Emission reduction potential, kt				Health-related benefits, million Euro2015	
	NOx	SOx	NMVOC	PM2.5	Kosovo	Europe
Low	2.2	23	4.2	1.8	166	889
Mid	3.1	27	15	6.4	299	1354
MTFR	5.1	31	19	8.2	367	1616
Green	13	34	21	9.1	414	1843

The aforementioned emission reduction potentials in the key areas can be reached by a combination of different measures and policy instruments. The analysis concludes that the measures with the highest emission reduction potential is related to switching to:

- Non-emissive sources
- Extension of central heating system combined with CHP improvements
- SO2 end-of-pipe and process control at power plants

However, effectiveness is not the only factor that needs to be considered when planning emission reduction measures; other important aspects are e.g., costs and cost-effectiveness in terms of benefit-to-cost ratios. Reaching the entire emission reduction potential, on the other hand, would require high abatement costs that in some cases exceed the health benefits obtained.

The same measure proposed to be implemented in Kosovo might appear cost-effective or not depending on whether benefit assessment includes positive health effects on the entire European population, or only on the inhabitants in Kosovo. The analysis shows that only up to about one third of the total positive effects from measures taken in Kosovo, occurs within the country. The remaining effects can be observed in neighbouring countries – this is due to the trans-boundary effects of emissions. Similarly, measures in other European countries, especially those bordering Kosovo, would affect the inhabitants of the Kosovo.

To enhance implementation of emission reduction measures in the key emitting sectors in Kosovo, a range of policy instruments can be used. The study proposes nine different policy instruments to target Kosovo's emissions of air pollutants. Several of relevant policy instruments are of legal character. This study concludes that Kosovo's national environmental legislation is currently not in full compliance with the relevant EU legislation. Possible solutions might be better harmonization with the EU legislation by drafting enforcement legislative acts and appointing responsibilities.

Within the sector for **residential wood combustion**, the policy instrument analysis proposes instruments that relates to investment support and tax reductions for energy efficiency measures in the building sector, economic support to install retrofit ESP on existing stoves, economic incentives to promote a switch into solar and heat pumps. Moreover, regulations to prohibit coal combustion and biomass certification are instruments that are recommended to reduce environmental impact from the same sector.

In the second key sector, **diesel road transport** – policy instruments such as low emission zones, vehicle replacement programs and subsidies/tax reductions related to import of electric and/or hybrid cars are proposed. All three proposed measures have been successfully implemented in other European cities with good effects on traffic and emissions, but it is important to note that it is vital, especially when it comes to transport, to work with supporting measures to enable successful implementation.

For the third key sector, **heat and power generation**; taxes and refundable changes on emission of air pollutants, SO2 and NOX are proposed to be implemented also a carbon tax, to correct the negative externalities of carbon emissions is proposed as an option. Many of EU's member states have subsidies and financial incentives for grid infrastructure, as well as for renewables, which provides an efficient district heating generation. Examples for several EU countries are discussed and highlighted as good examples, which Kosovo could follow when implementing support schemes such as financing grants, premiums, low-interest loans, or tax exemptions for district heating.

The report, **Air Pollution in Kosovo**, briefly discusses aspects related to improved air quality from a gender and social inclusion perspective.
Women are in most cases the primary users of household energy, thus suffer more from indoor particulate matter, unsafe water resources as well as sanitation. In all three key sectors, taxes are suggested as a policy instrument. The gender analysis proposes that policy and decision makers should consider three main issues when it comes to implementing an environmental tax in Kosovo:

- The gender implication of the tax measure itself
- Gender implications of the tax policy package
- The gender implications of the outcome of the tax

Improvement of stoves are likely to bring positive benefits for women, as cooking is often considered a women's domain. By providing targeted support to the installation of retrofit ESP it can give positive gender aspects within the residential wood combustion sector.

Imposing a tax on fossil fuel are likely to directly affect women due to income disparities between men and their socio-economic status. One suggestion is that any low-income tax credit could be increased in line with the tax rate to offset distributional impacts during the life of the tax. Another aspect within the heat and power generation sector relates to considering how any extra revenue, such as

taxes and refundable charges on emissions is reinvested, and particular may benefit women.

Subsidies or tax reductions targeted import of electric or hybrid cars needs to be well-targeted, as households and individuals with higher incomes and a good financial situation can buy an electric or hybrid car without any subsidy or tax reduction. The study proposes increased subsidies targeting low-income households, which are mainly represented by women. To avoid negative and unwanted externalities, we also suggest and encourage policy and decision makers to thoroughly consider gender aspects before proceeding with measures and policy instruments.

Lastly, Kosovo is facing many challenges in terms of air quality. However, many good initiatives and efforts are going on and improvements are being made. An overall key recommendation is related to the fact that this study shows that Kosovo can significantly improve its air quality by implementing its current legislation. Combined with further implementation of technical measures related to Kosovo's current plans.

The hope is for this executive summary and report **Air Pollution in Kosovo** to provide inspiration and guidance for Kosovo in their endeavour to improve air quality.