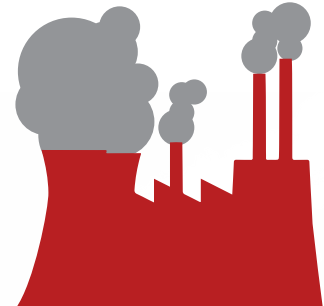


THE UNPAID HEALTH BILL

How coal power plants in the WESTERN BALKANS make us sick



This report provides an assessment of the **health impacts and costs** associated with **air pollution** from **coal** and **lignite combustion** at existing **power stations** in **Bosnia and Herzegovina, Kosovo, Macedonia, Montenegro and Serbia in the Western Balkans**. It also estimates the costs for planned plants.

Existing coal power plants create up to 8.5 EUR billion per year in health costs

Coal power plants emit thousands of tonnes of hazardous air pollutants each year making a significant contribution to air pollution in the Balkans region and beyond. Existing coal plants in the above-mentioned five Western Balkan countries create a total of between 2.9 to 8.5 EUR billion per year in health costs to people and governments in Europe. These plants are generally operating on low environmental standards generating high levels of polluting emissions and high impacts on health.

Coal power plants in the Western Balkans cause damage to health beyond national borders due to long-distance travel of pollutants in the air. But existing coal plants also cause significant damage in the Western Balkans region, with 1.2 to 3.4 EUR billion in health costs per year.

Plans to increase capacity

The Western Balkans power infrastructure is in transition. Currently home to 15 existing coal plants with an installed capacity of 8.1 gigawatt (GW), the Western Balkans could see the installation of 24 new projects with 7.8 GW capacity. With the change to new coal plants, some old polluting plants will be shut down though it is unclear which ones and how many will continue to operate. This building of new coal plants could in the end lead to an overall increase in capacity in the region.

New coal power plants could add health costs of up to 528 EUR million per year

New coal plants would operate under much stricter air emission standards than today. However, new plants would still create additional health costs for the European population of **between 190 and 528 EUR million per year** (which includes 73 to 203 EUR million per year in the Western Balkan countries).

HEAL recommends that: National energy plans should be revised to reduce the reliance on coal and ultimately to phase it out, and to increase investment in renewables. This presents an important opportunity in health prevention in the Western Balkans.



Spotlight on the Western Balkans

Countries in this region comprise Bosnia and Herzegovina, Kosovo, Macedonia, Montenegro and Serbia. Albania would normally be included in this region; however, it has been excluded since there are no coal plants there. These five countries have returned to the European political agenda after a series of regional conflicts followed by a significant transition during recent decades and prospects for accession to the EU. The region is similar in geographical area to some EU countries, such as Poland and the United Kingdom (UK), and in population size to the Netherlands. The average GDP is lower than for EU countries as is health care spending per head. Air pollution is a major health hazard in the Western Balkan countries. Recent World Health Organization (WHO) figures show the significant economic cost of premature deaths from air pollution. Serbia is losing the equivalent of 33.5 percent of its GDP to costs from premature death due to air pollution; Bosnia and Herzegovina 21.5 percent, Macedonia 19.9 percent and Montenegro 14.5 percent. By comparison, Germany is losing 4.5 percent and the UK 3.7 percent.¹

What are the unpaid health costs?

This report provides a monetisation of the health impacts of air pollution from coal power plants in the Western Balkans. The estimate brings together the costs or damages to individuals, governments and the economy from premature deaths and poor health associated with exposure to air polluted by coal.

The burden on health from coal in the Western Balkans is among the highest in the European region. Currently, the five Western Balkan countries are home to 15 existing coal plants with 35 units and an installed capacity of 8.1 GW. By November 2015, there were plans for potentially 24 new installations generating an additional 7.8 GW. While some of the old installations will be replaced with new coal plants, hence not adding new capacity, some of the plans for new plants are intended to increase capacity. While many countries in the EU are moving away from coal and towards healthier sources of energy, such as solar and wind power, coal power still has a firm place in the energy future of the Western Balkans countries.

“The costs to health are bigger from coal power generation than from any other energy source.”

Professor Paul Wilkinson,
London School of Hygiene and
Tropical Medicine (LSHTM), UK



The Western Balkans are not alone in creating health costs from coal combustion and therefore subsidising this most polluting form of energy. Most countries with coal plants in Europe and around the world are doing the same. The subsidies reach the producers through “unpaid costs” on human health, which occur because the health damage has to be borne by individuals, their families and society, and not by those responsible for the pollution. Put another way, the vast subsidies, or sums transferred to the owners of the plants, are largely due to the polluting plants not paying the costs imposed on people and governments by the burning of coal for electricity. Some governments are also providing direct financial subsidies.

“This report quantifies for the first time the health costs in Europe associated with exposure to air pollution from coal power plants in the Western Balkans at up



to 8.5 EUR billion per year. Opting out of coal offers a better future with cleaner air and better health in these countries, and could contribute to reducing environmental health inequalities. It also makes sense for the EU to encourage the Western Balkans to reconsider its reliance on coal since a large share of the total annual costs are to health in countries of Europe.”

Génon K Jensen, Executive Director,
Health and Environment Alliance

The calculation

Research commissioned for this report has estimated the health costs or damages resulting from the air pollution from coal plants in the Western Balkans, and the potential costs associated with future expansion plans. It shows that coal power plants in five Western Balkan countries are producing costs of between 2.9 and up to 8.5 billion EUR per year in damages to the health of the citizens in Europe.

The lower total figure shown in the map below, 2,988 EUR million per year, is an estimate based on one approach to the valuation of mortality: value of a life year' (VOLY) to the estimated loss of life expectancy across the population. While the figure of 8,561 EUR million per year is based on another approach: value of a statistical life (VSL) to the estimated number of deaths.

The figures in this analysis were produced based on methodology used by the EU Commission and the

WHO. It is scientifically proven that air pollution leads to premature death, and to heart and lung disease. The analysis considers these impacts based on available data. Air pollution is responsible for a number of health impacts across the whole population, but is a particular concern for vulnerable groups, such as children and elderly people^{2,3,4}.

The estimates are derived from different components of the harm caused to humans by air pollution associated with coal-fired electricity generation plants. The health damages comprise of costs associated with:

- premature deaths;
- additional health care costs arising from hospital admissions, increased levels of medication, etc;
- lost productivity from workers taking time off for sickness and reduced activity among the working age population, and;
- the loss of what is termed 'utility' or 'welfare' in the economic literature through pain, suffering, and reduced life expectancy.

The unpaid health bill in the Western Balkans

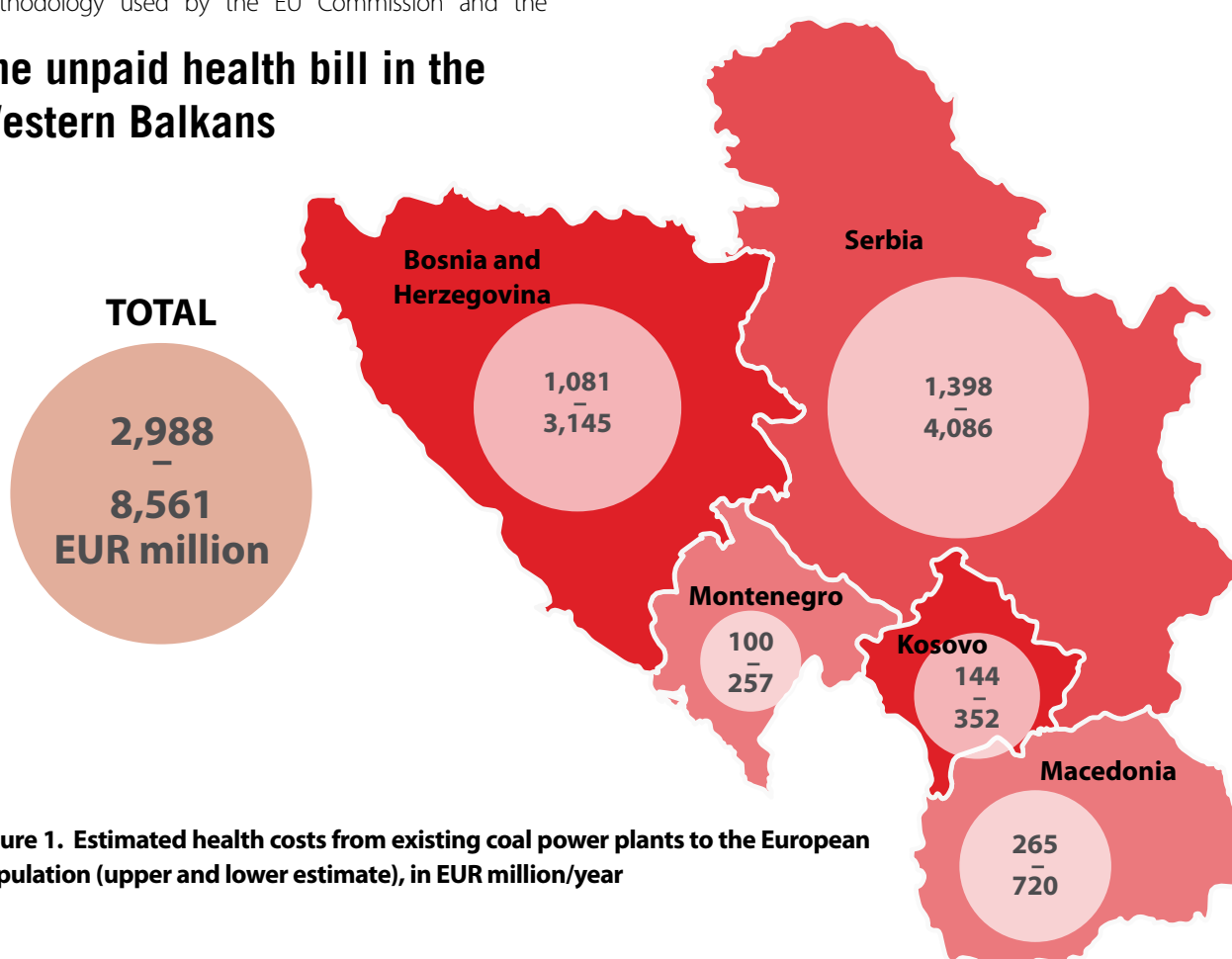


Figure 1. Estimated health costs from existing coal power plants to the European population (upper and lower estimate), in EUR million/year

What are the damages to health?

Figure 2 below shows the health damage in terms of premature deaths, respiratory and cardiovascular hospital admissions, new cases of chronic bronchitis and lower respiratory problems, medication use and days of restricted activity including lost working days.

The most severe impact is at the top (premature death) affecting a smaller number of the population and the least severe impact is at the bottom with a large number of people affected (cases of lower respiratory symptoms).

Health bill is an underestimate

The total figure of **up to 8.5 billion EUR per year** is an underestimate because it does not include all health conditions related to exposure to air pollution. For example, it does not include an assessment of the costs of strokes or any quantification of the health costs resulting from mercury pollution from existing and future coal plants. It does not take into account the recent evidence which suggests that exposure to air pollution is also related to lung cancer, chronic obstructive pulmonary disease (COPD), impaired lung function, low birth weight, pre-term delivery, and cognitive development in children. The estimate does not include any health costs arising from the full life cycle of coal, such as mining and waste disposal; nor indirect health costs resulting from CO₂ emissions that fuel climate change, which in turn impacts health.

Health impacts and costs from coal power generation

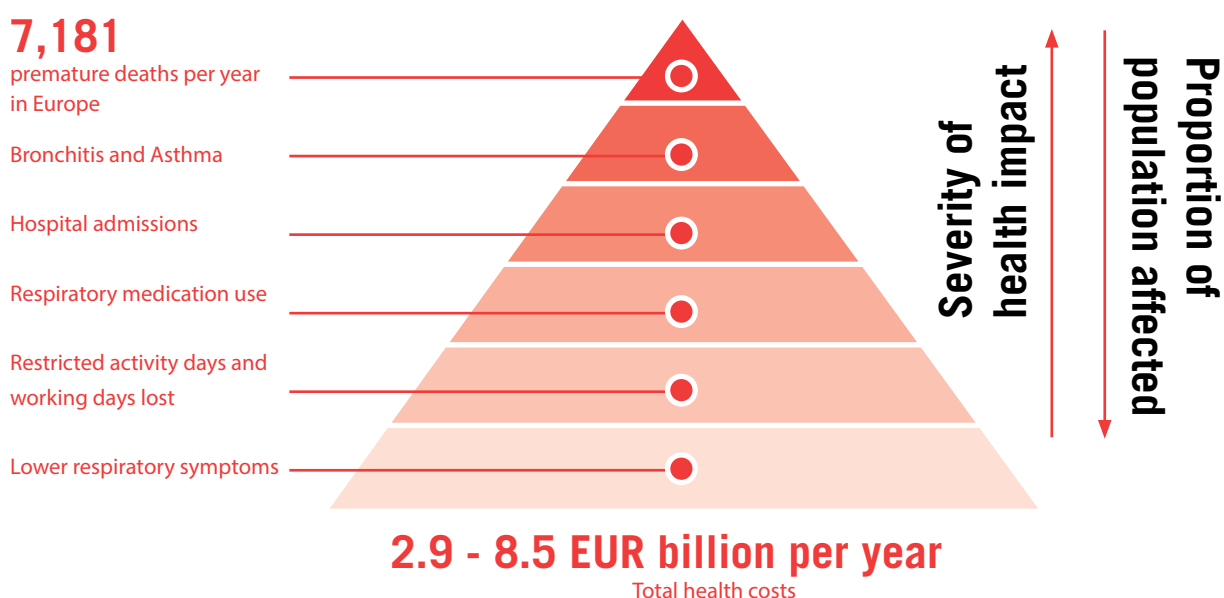


Figure 2. Factors contributing to total damages caused by coal power plants in Western Balkans

Methodology at a glance

The analysis and the monetisation of the health impacts follows the Impact Pathway Approach (IPA) developed in ExternE (External costs of Energy)⁵ with a logical pathway from emission through exposure of the population to pollution at risk to impact assessment and finally monetisation.

Calculation and monetisation of health costs

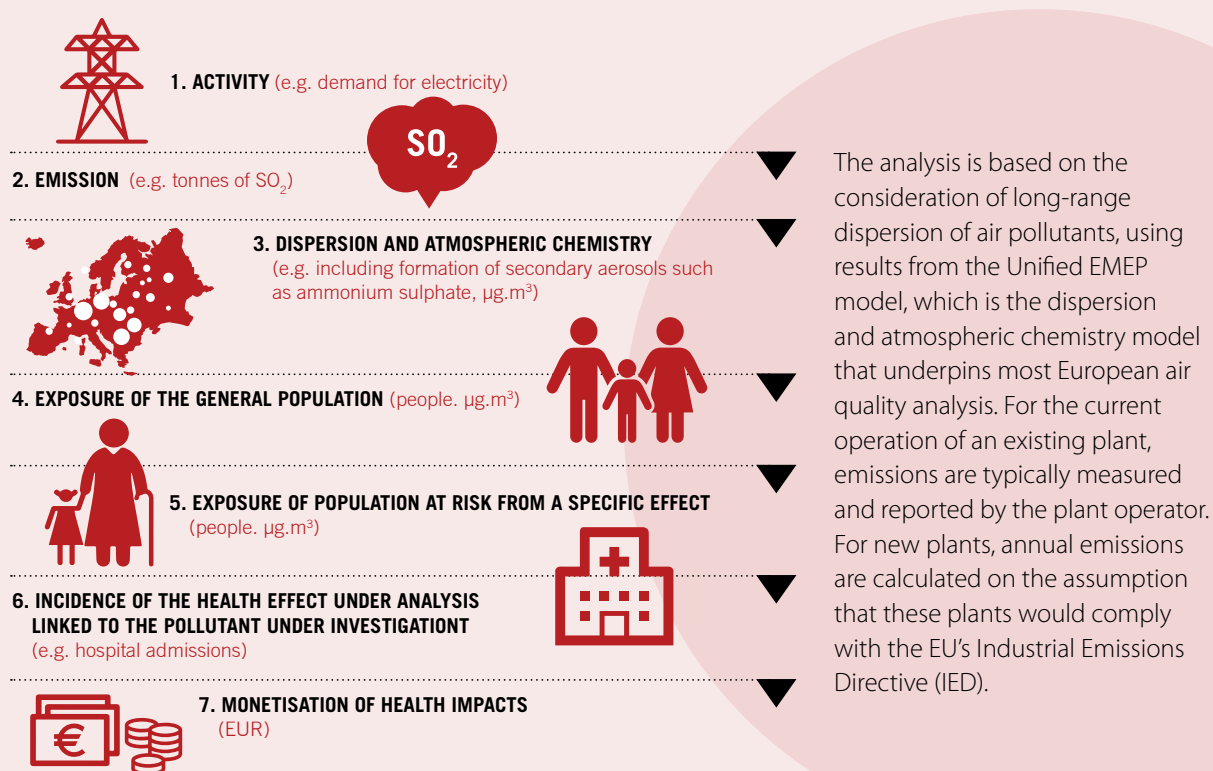


Figure 3. The impact pathway approach (ExternE)

Data used in this report for existing plants refers to the year 2013, or the latest available, and comes from the following sources:

COUNTRY	DATA SOURCE FOR EMISSIONS FROM COAL-FIRED PLANTS
Bosnia & Herzegovina	Study by Center for Ecology and Energy: "Health impacts of coal fired power generation in Tuzla", p.11 Report on the environment by electricity company, Republic Hydro-Meteorological Service, Banja Luka
Kosovo	Study World Bank "Kosovo Country Environmental analysis", p.55
Macedonia	Study by Eco-svest "What is the cost of life? – economic valuation of effects on human health and life from Macedonian thermal power plants", p.19
Montenegro	National strategy for air quality by Ministry of sustainable development and tourism, p.128
Serbia	E-PRTR database year 2013

Health damage from coal power plant emissions

How inhalation of particulate matter (PM) may affect our health

Lungs

- Inflammation
- Oxidative stress
- Accelerated progression and exacerbation of COPD
- Increased respiratory symptoms
- Effected pulmonary reflexes
- Reduced lung function
- Higher lung cancer risk

Blood

- Altered rheology
- Increased coagulability
- Translocated particles
- Peripheral thrombosis
- Reduced oxygen saturation

FURTHER IMPACTS

- Reduced birth weight
- Pre-term birth
- Skin, bladder cancer
- Diabetes

Brain

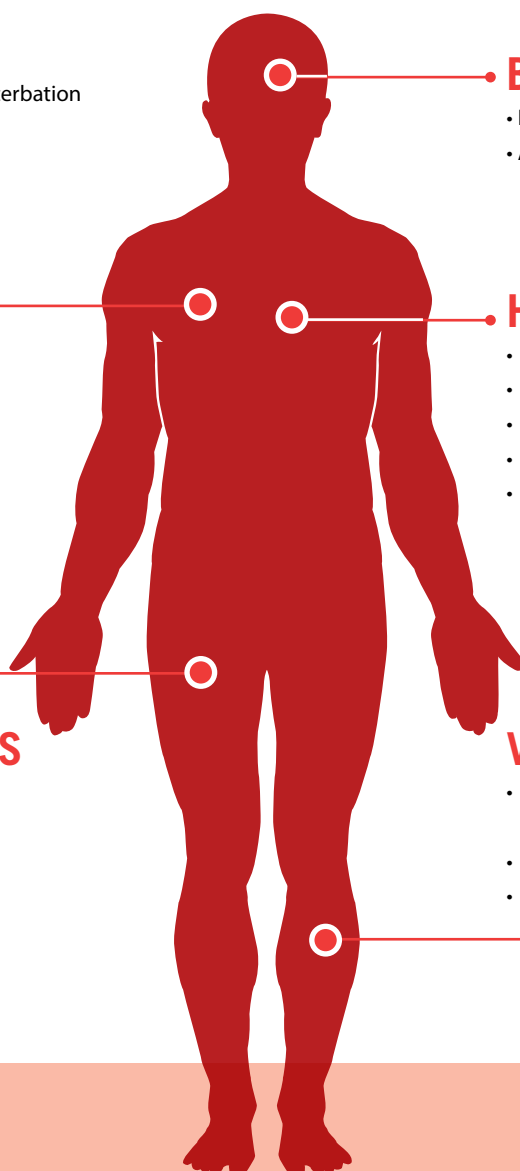
- Increased cerebrovascular ischemia
- ADHD

Heart

- Altered cardiac autonomic function
- Oxidative stress
- Increased dysrhythmic susceptibility
- Altered cardiac repolarisaion
- Increased myocardial ischemia

Vasculature

- Atherosclerosis, accelerated progression and destabilisation of plaques
- Endothelial dysfunction
- Vasoconstriction and hypertension



Children, even before birth, are particularly susceptible to air pollutants. Increasing evidence shows how early-life exposure to air pollutants is contributing to higher risks of developing chronic diseases later in life, including obesity, diabetes, and hormone related cancers. Furthermore, recent studies found associations between exposure to outdoor air pollution during pregnancy and lower birth weight, as well as higher rates of preterm birth and pre-eclampsia.

The air pollutants sulphur dioxide, nitrogen oxides and others also react in the atmosphere to form particulate matter (PM), which then causes health impacts. In addition to PM, ozone is another air pollutant that harms our health.

Figure 4. Exposure to particulate matter (PM_{2.5}) causes a multitude of health impacts

Adapted from Aphekom project (2012): Summary report

Air quality recognised as an urgent problem

Air quality in the Western Balkan countries is among the worst in Europe.

According to figures from the WHO, the South East Europe region is losing the equivalent of 19 percent of its GDP to costs associated with premature deaths from air pollution. In Serbia, health costs associated with air pollution total 33.5 percent of GDP, in Bosnia and Herzegovina 21.5 percent, in Macedonia 19.9 percent and in Montenegro 14.5 percent. These percentages are much lower in the Western Europe.¹

Serbia and Montenegro (grouped together) are estimated to have the second highest premature death rate associated with air pollution in Europe, with only Bulgaria having a higher rate. Romania and Poland take third and fourth positions respectively.⁶

Peak smog events in the Western Balkans can last for days. In Sarajevo, the capital of Bosnia and Herzegovina, days of peak levels of smog in 2015 prompted the authorities to attempt to deal with dangerous air pollution. They issued health warnings asking residents to adopt non-polluting means of transportation and to reduce their outdoor activity, particularly during morning and evening hours when smog pollution is at its worst.



"In big, urban areas like ours, air pollution has a considerable effect on the health of our citizens. People living in large industrial zones,

where there is a dense, highly developed transport system, breathe in a large amount of harmful agents that are in the air. Particularly as the weather heats up, large amounts of ash, smoke and allergens are present in the air. What I conclude is that this is a period when we help a number of patients, primarily with respiratory diseases, asthma, COPD, as well as those with acute respiratory diseases resulting from the harmful effects of pollutants in the atmosphere."

Dr. Radmila Šehić,
a doctor in the emergency department (ED) of a health care centre in
Belgrade, Serbia's capital

"Reducing the level of pollutants in the air would produce very significant reductions in premature deaths, suffering from respiratory and heart problems, and health care costs in Serbia. Health protection must therefore be considered in energy choices. Long-term effects on population health in Serbia should be taken into account when developing energy policies."

Professor Dr. Berislav Vekić,
State Secretary for Health, Serbia



Poor record on air quality

The WHO has carried out extensive reviews of the science on the health effects of air pollution. It has put forward recommendations for air quality concentrations that should be kept in order to protect health. For example, for the larger parts of PM, known as PM₁₀, the WHO has set a guideline of 20 µg/m³ annual average. The EU's air quality standard is 40 µg/m³.

However, the WHO also points out that there is no safe threshold for PM. Even the lowest level has effects on health.

The recommendations are regularly exceeded in the Western Balkans region.⁷ Limit levels of PM₁₀ were exceeded in Bosnia and Herzegovina, Kosovo, Macedonia and Montenegro in 2012.

The annual average PM₁₀ concentrations for the whole Western Balkans was 56.8 µg/m³ - well above the limits set to protect health. The annual mean in Macedonia (87.6 µg/m³ concentration of PM₁₀) was double the EU's air quality standard.

In addition to setting a PM₁₀ annual average that is higher than WHO guidelines, the EU also allows for a maximum of 35 days a year in which the PM₁₀ daily concentrations can exceed 50 µg/m³. In the Western Balkans, exposure to very polluted air is very frequent. Smog can last for days.

Air pollution can be at high levels for two or three months per year. In 2012, Macedonia experienced more than four months (129 days) of high levels of PM₁₀.

In terms of the health damage, fine PM - PM_{2.5} - is of most concern for health protection, given that these tiny particles can enter the bloodstream via the lung. Two countries in the region reported concentrations: Bosnia and Herzegovina and Macedonia both reported levels that exceeded the limits for PM_{2.5}. In Bosnia, the level was 64.1 µg/m³; that is two and a half times higher than the limit.



"In Belgrade and other parts of Serbia, air quality is for most of the wintertime above the legal limits. This air pollution affects our health, particularly the respiratory system."

Professor. Dr Gorica Sbutega Milosevic,
Faculty of Medicine, University of Belgrade, Serbia

Air quality in the Western Balkans harms health

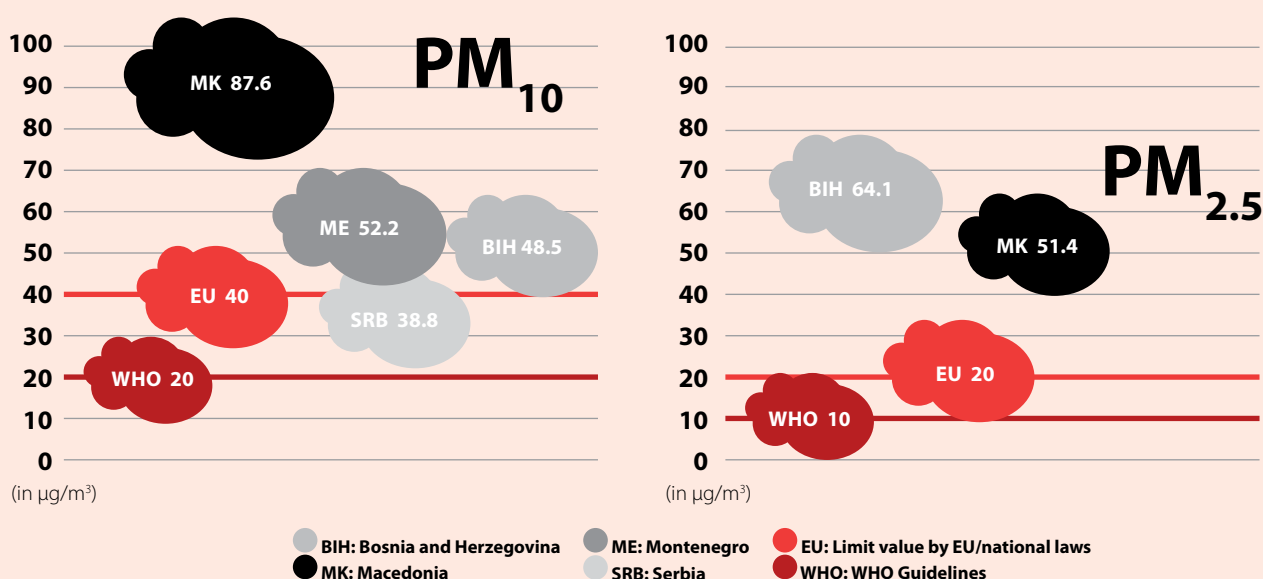


Figure 5. Annual mean concentrations of PM₁₀ and PM_{2.5} in Western Balkan countries and limit values set by national laws/EU laws and WHO guidelines

Coal power dependency and its contribution to air pollution in the Western Balkans

Emissions from coal power plants make an important contribution to poor air quality.⁸ Each year, one large coal power plant emits thousands of tonnes of hazardous air pollutants including heavy metals. Pollutants such as sulphur dioxide (SO₂) and nitrogen oxides (NO_x) react in the atmosphere to form ozone and (secondary) particulate matter, which are of greatest concern to health.

The Pljevlja coal plant was solely responsible for more than 90 percent of national SO₂ and half of the NO₂ emissions in Montenegro in 2011. Furthermore, this plant contributed 59 percent of PM₁₀ emissions and 42 percent of PM_{2.5} emissions.

In Serbia, coal plants were responsible for more than 80 percent of national SO₂ emissions and half of NO₂ emissions in 2013⁹. These plants were also contributing over 15 percent of PM emissions (PM_{2.5} and PM₁₀).

Countries are heavily dependent on coal for electricity generation

Serbia has the largest electricity system in the region with some 60 percent of electricity generated from lignite¹⁰. **Bosnia and Herzegovina** produces two thirds of its electricity from coal. While **Macedonia and Kosovo** are smaller energy systems, they are greatly dependent on fossil fuels. Macedonia produces a little under 80 percent of electricity from coal while being heavily reliant on coal as a country. Kosovo produces 85 percent of its electricity from coal. **Montenegro** uses

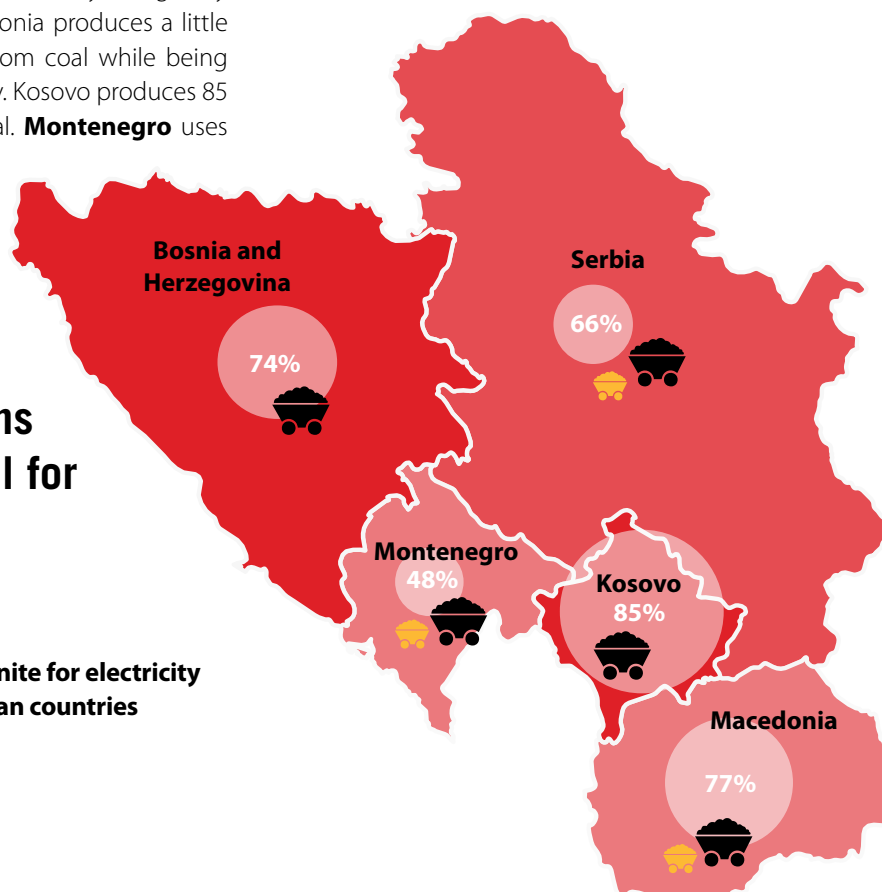
the least coal in its energy mix but it still accounts for almost a half of the energy production. Currently, these five countries have no plans to turn away from coal.

By far the largest coal plant in the Western Balkans is located just 40 kilometres from the Serbian capital, Belgrade. The plant, named Nikola Tesla A, has six units with a total capacity of 1,690 megawatts electric (MW). Second biggest is the Nikola Tesla B plant with two units comprising 1,240 MW capacity.

Almost all Western Balkan countries have huge coal plants situated next to major towns. Close to Kosovo's capital, Pristina are Kosova A and Kosova B plants of a total of over 1,000 MW. Similarly, Bosnia and Herzegovina has the Tuzla plant, with a capacity of 715 MW, just next to Tuzla, the second biggest city in the Federation of Bosnia and Herzegovina.

The Western Balkans dependency on coal for power generation

Figure 6: Reliance on coal or lignite for electricity generation in the Western Balkan countries



Most of the plants burn local lignite that comes from mines in the vicinity of plants. Clusters of coal mines and thermal power plants represent some of the largest industrial centres in these countries and shape the social and economic structure of the entire region¹¹. The majority of the power plants (60 percent of units) are more than 35 years old and should be retrofitted (updated with new technology to improve efficiency) or shut down¹².

The health costs of fuels such as lignite and coal produce some of the highest external costs amongst all energy forms¹³. They are the most expensive energy forms in terms of resulting premature deaths. This can be shown by comparing the health costs of lignite or coal power generation (per terawatt hours, or TWh, produced) per number of premature deaths compared with other forms of energy. The terawatt hour (TWh) measures electricity produced (1 TWh is 1,000,000,000 kilowatt hours). It is the unit used in consumer electricity bills.

One study (known as ExternE)⁵ estimated the main health effects for different fuels, and has shown that the number of premature deaths caused by lignite is much higher than the number of premature deaths caused by other energy sources such as gas or biomass (Figure 7). This can be attributed to the very high amounts of air pollutants released from lignite burning. By comparison, premature deaths from renewables are likely to be negligible.

In the estimation by HEAL, coal plants in the Western Balkans cause a much higher number of premature deaths per TWh than in the results from ExternE for the EU and some plants in the US. This is most likely due to the lack of filters in Western Balkan plants. Some advanced types of filter can remove up to 98 percent of SO₂ from fumes and 10-30 percent of PM.

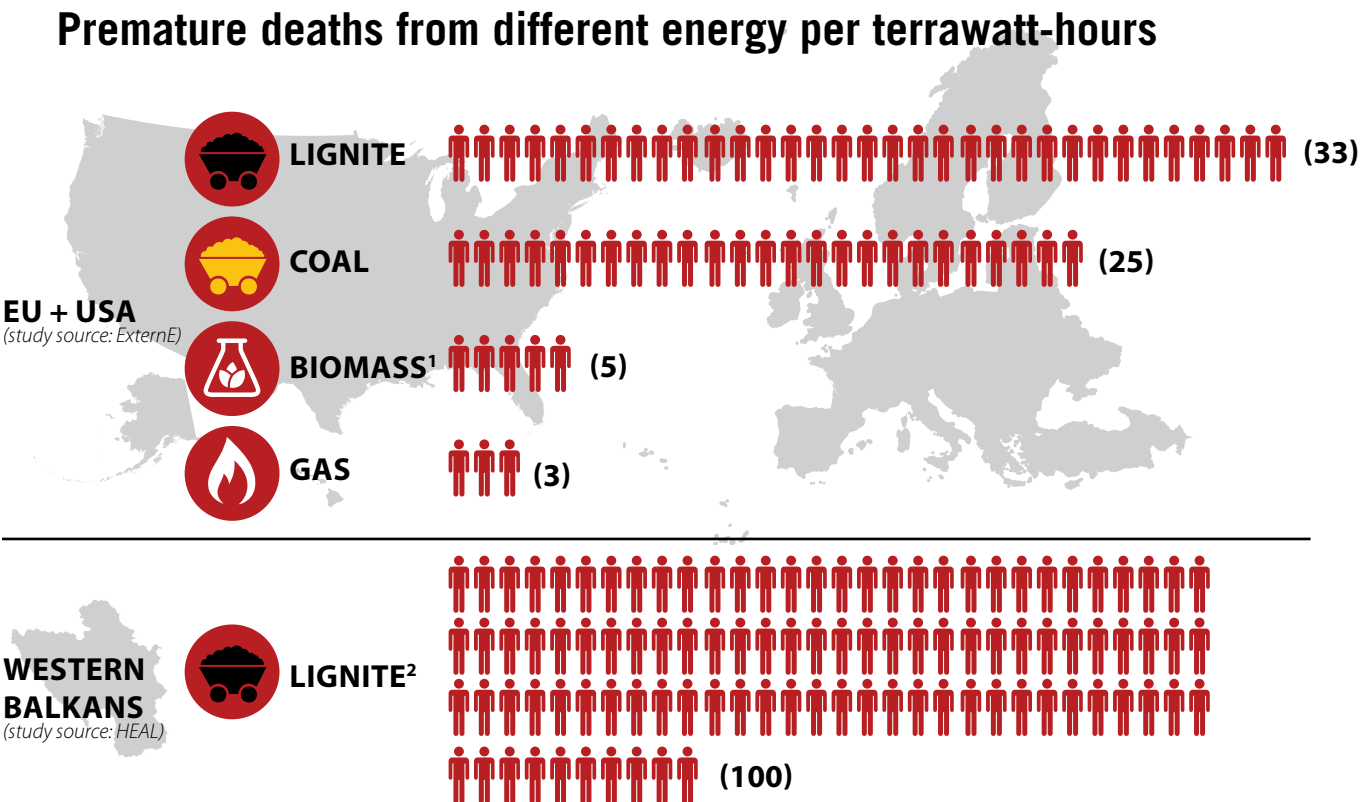


Figure 7. Health effects of electricity generation by primary energy source (premature deaths per TWh)

¹ Health burden from biofuels depends on the type of fuel and the mode of combustion
² Based on the assumption that the plants (using lignite, and to a lesser extent coal) in each country are operating at full load.

Are the Western Balkan coal plants major contributors of pollution in Europe?

The Western Balkans region is home to some of the most polluting coal-fired power stations in Europe¹⁴.

The figures below give information on the emissions of some of the most problematic air pollutants: PM_{2.5}, sulphur dioxide (SO₂) and nitrogen oxides (NO_x). Six of the biggest emitters of PM_{2.5} in Europe are in countries of the Western Balkans. Three are in Serbia.

The region is also host to seven of the 10 biggest emitters of sulphur dioxide (SO₂) and one of the top 10 emitters of nitrogen oxides (NO_x) in the European region.

Meet the ten most polluting coal power plants in Europe

PM_{2.5}



SO₂



NO_x



Figure 8. Coal-fired power plants in Europe emitting the greatest quantities of PM_{2.5}, SO₂, and NO_x

EU Western Balkans

PM_{2.5} is of greatest concern to health because its tiny fine particles can enter the human bloodstream. Both Kosova plants (Kosova A and Kosova B) are lead emitters in the Western Balkans with a total of 7,500 tonnes per year (t/y). The Bitola plant is another significant emitter of this pollutant with over 2,700 t/y. Among the top 10 polluting plants in terms of PM_{2.5} are also Nikola Tesla A, Kostolac B and Kolubara in Serbia.

Although PM is considered to be the worst pollutant for health, SO₂ is the pollutant generally taken to define which plant is the most polluting overall. It can react in the atmosphere to form PM, which causes a myriad of health impacts.

Of the seven coal plants in the Western Balkan that are the biggest SO₂ polluters in wider Europe, the Ugljevik plant in Bosnia is the pollution front-runner for SO₂

emissions with 154,380 t/y. It is the most polluting coal plant in the whole of Europe. Nikola Tesla B and Kostolac B, both in Serbia, are also big SO₂ polluters, emitting around 90,000 t/y each.

The biggest emissions of NO_x in the Western Balkans are produced by the Nikola Tesla A plant in Serbia emitting 20,100 tonnes of NO_x per year. The Bitola plant in Macedonian comes close behind with 16,600 t/y. Kosova B plant emits 14,520 t/y of this pollutant to the air and almost the same quantity is emitted by Nikola Tesla B. Again, NO_x reacts in the atmosphere to form PM. Recently, many studies have demonstrated that NO_x itself causes health impacts.

Coal plants also release massive quantities of CO₂ contributing to climate change.

"By aligning their energy policies with the EU energy roadmap, closing all coal power plants and replacing them with renewable energy sources, the countries of South East Europe can have a cleaner and cheaper energy system."

Garret Tankosic Kelly, SEE Change Network, a regional think tank on sustainable development



Expansion plans would only add to health burden

Countries of the Western Balkans region have announced plans to build new coal plants. The expansion could include 24 new installations, with a capacity of 7.8 GW, some of which are intended to increase capacity and electricity production. Currently there are 15 plants with 8.1 GW capacity.¹⁵

If plans for future coal plants go ahead in full, additional health costs could total between 190 and 528 EUR million per year.

Any expansion of capacity will add to health damage. However, due to anticipated higher standards of pollution control, the costs to health will be relatively less.

Some announcements are aimed at adding to existing capacity; others are for plants that would replace

existing ones. Predicting which coal plants will actually be built is beyond the scope of this report¹⁶.

The new coal power stations are planned in all five countries. Montenegro has announced plans to add 0.8 GW capacity; this would mean a four-fold increase in current coal capacity. A Pljevlja II plant is planned while shutting down the old plant. Serbia, which has the greatest current capacity (4.2 GW), has announced projects or plans for up to an additional 2.2 GW. Kosovo has had plans to build new plants for the last decade. The latest project proposed is a 500 MW unit. The country has two power plants with an installed capacity of over 1 GW. In 2014, technical failures led to a tragic explosion in Kosova A, where several people lost their lives. Bosnia and Herzegovina plans to invest in coal plants that could triple current capacity: from 1.7 GW to an additional 3.9 GW from new installations.

The unpaid health bill for existing and future coal plants in the Western Balkans

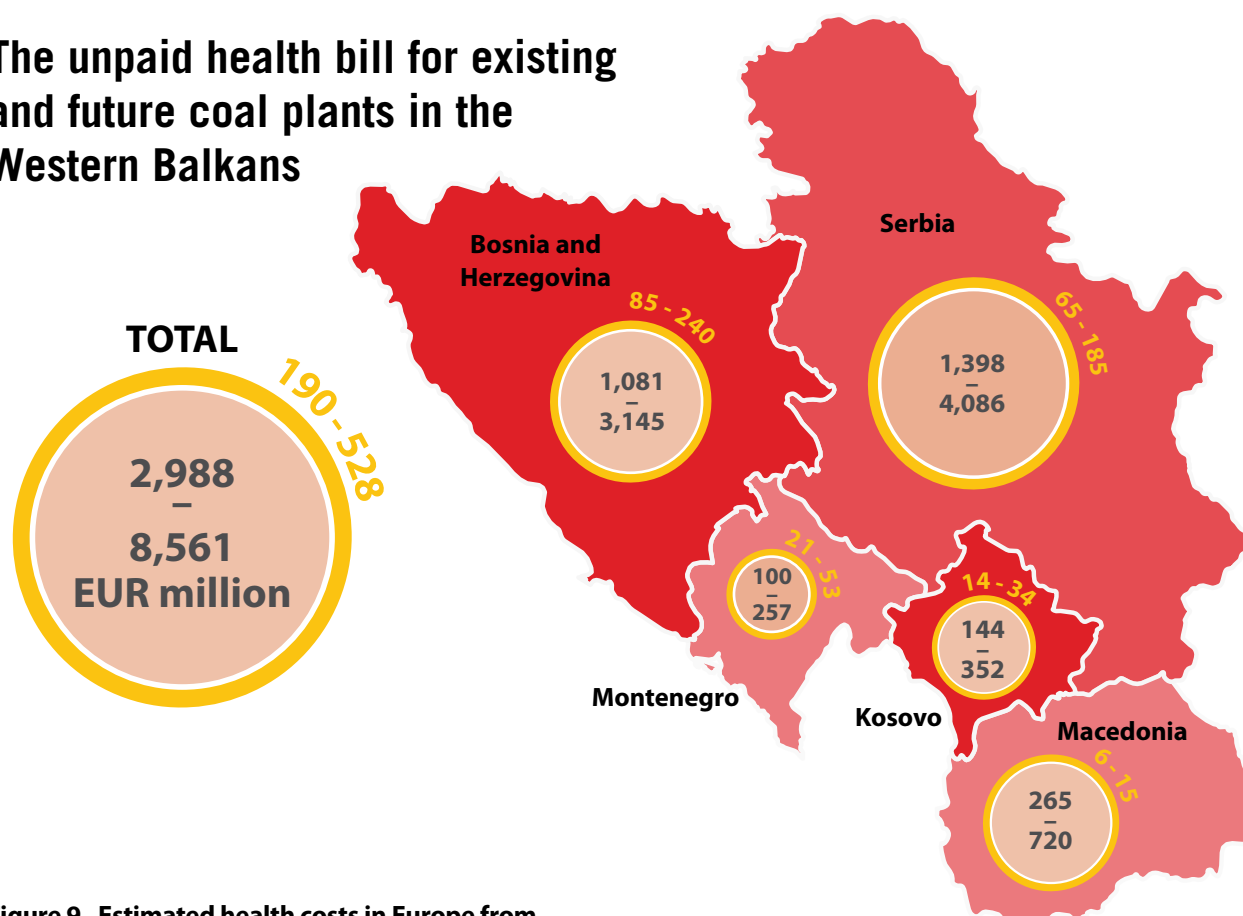


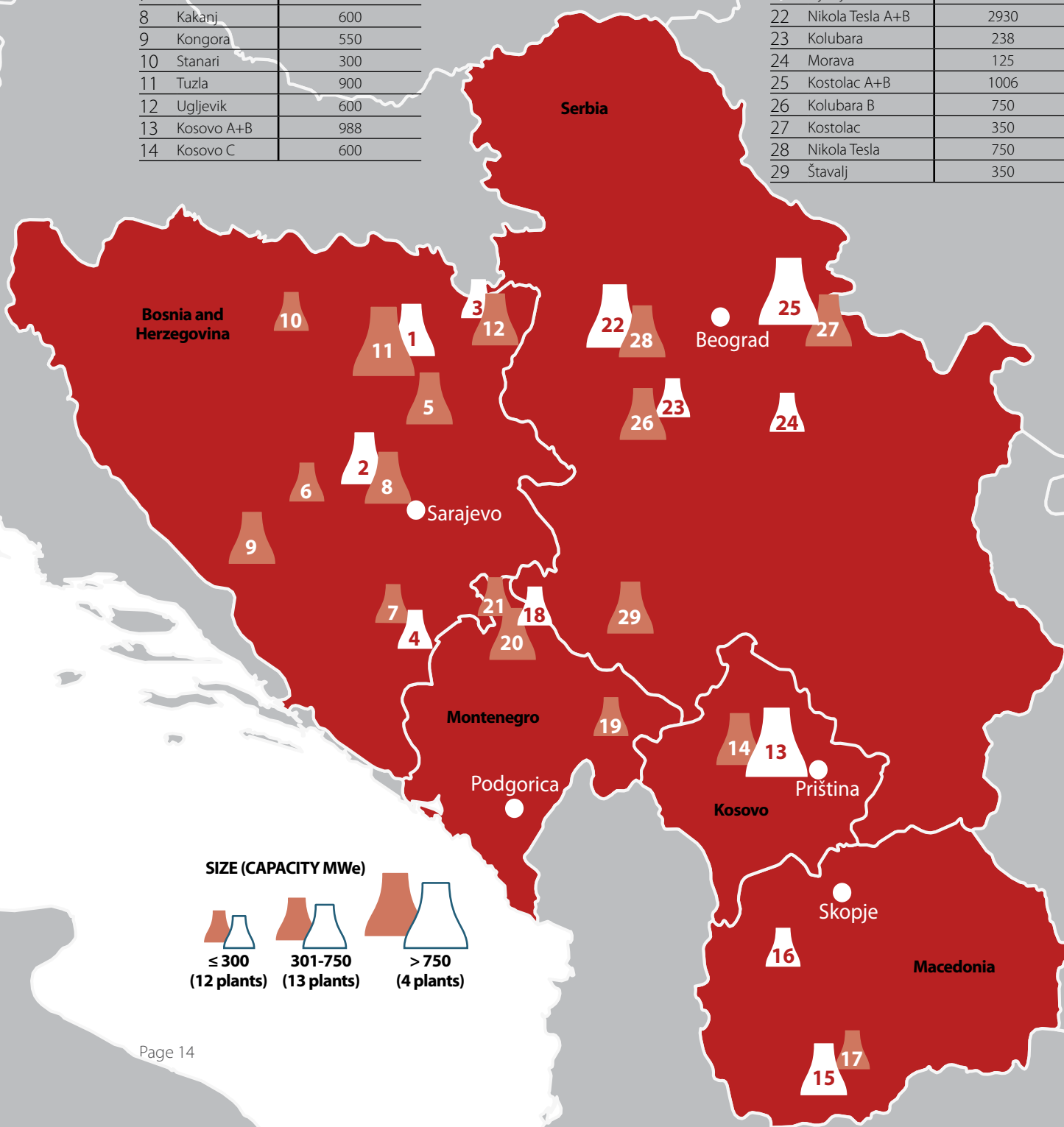
Figure 9. Estimated health costs in Europe from
 ○ planned plants and ● existing plants in the Western Balkans (lower to upper bound), in EUR million/year

LOCATION AND SIZE OF EXISTING AND NEW POWER PLANTS IN THE WESTERN BALKANS

PLANT	CAPACITY (MWe)
1 Tuzla	715
2 Kakanj	450
3 Ugljevik	300
4 Gacko	300
5 Banovici	350
6 Bugojno	300
7 Gacko	300
8 Kakanj	600
9 Kongora	550
10 Stanari	300
11 Tuzla	900
12 Ugljevik	600
13 Kosovo A+B	988
14 Kosovo C	600

 existing plant  new plant

PLANT	CAPACITY (MWe)
15 Bitola	675
16 Oslomej	125
17 Mariovo	300
18 Pljevlja I	210
19 Berane	110
20 Maoce	500
21 Pljevlja II	220
22 Nikola Tesla A+B	2930
23 Kolubara	238
24 Morava	125
25 Kostolac A+B	1006
26 Kolubara B	750
27 Kostolac	350
28 Nikola Tesla	750
29 Štavalj	350



How Europe is damaged by coal power plants in the Western Balkans

The health damage caused by combustion in coal plants is not limited to the proximity of the power plant. Some pollutants in exhaust clouds from the smokestack can be transported to neighbouring EU countries and beyond. This means that plants in the Western Balkans can make a significant contribution to air pollution in the European region.

The findings of research for this report show that transboundary damage is significant. Total damage to health in Europe from coal power plants in the Western Balkans is estimated at between 2.9 and 8.5 billion EUR per year.

Previous analysis by HEAL has put the health costs from coal-powered electricity generation within the EU at 15.4 to 42.8 EUR billion annually¹⁷.

If all announced plans were realised, new plants in the Western Balkans could add another 190 to 528 EUR million per year to health damage in Europe.

Table 1. Health costs from existing plants operating under current conditions (lower to upper bound), in EUR million/year

	DAMAGE TO EUROPE (lower to upper bound), in EUR million/year	DAMAGE TO WESTERN BALKANS (lower to upper bound), in EUR million/year
Existing plant		
Bosnia and Herzegovina	1,081 – 3,145	390 – 1,134
Kosovo	144 – 352	70 – 169
Macedonia	265 – 720	109 – 297
Montenegro	100 – 257	43 – 109
Serbia	1,398 – 4,086	600 – 1,756
Existing total	2,988 – 8,561	1,211 – 3,464

Table 2. Health costs from planned new plants (lower to upper bound), in EUR million/year

	DAMAGE TO EUROPE (lower to upper bound), in EUR million/year	DAMAGE TO WESTERN BALKANS (lower to upper bound), in EUR million/year
New/planned plant		
Bosnia and Herzegovina	85 – 240	30 – 85
Kosovo	14 – 34	6 – 14
Macedonia	6 – 15	2 – 6
Montenegro	21 – 53	9 – 22
Serbia	65 – 185	26 – 76
New total	190 – 528	73 – 203

Note: Health costs given for the Western Balkans are part of the total health costs for Europe, and thus the amounts cannot be added up. In this context, Europe includes EU28 member states plus Albania, Belarus, Moldova, Norway, the Western regions of Russia, Switzerland, Ukraine, Bosnia and Herzegovina, Kosovo, Macedonia, Montenegro and Serbia.

The main contributors to the transboundary problem are NO_x and SO₂ as they can travel around 500 km on the winds. PM_{2.5} are also a problem for neighbouring countries and even beyond - they are very light and can travel more than 1,000km. PM₁₀ is heavier and a

local problem as they are only likely to travel around 10 km. All the transboundary pollution adds to any existing poor air quality status with consequences for the health of the people and the national health care systems.

The way forward: healthy energy choices

POLICY RECOMMENDATIONS



TO DECISION-MAKERS IN THE WESTERN BALKANS

THEY SHOULD >>>>>

→ **Support the rapid phase out of coal: Close all old coal-fired plants and do not build new ones**

All national energy, climate and health strategies should address the serious problem of impacts on health and the environment from coal-powered electricity generation.

The priority should be closing existing coal plants because they cause the largest damage to health and the environment especially in comparison to energy generation from renewables.

HEAL considers that a phase out of coal power generation for the EU is possible by 2040. The Western Balkan should achieve the de-carbonisation of the power sector in about the same time frame.

Building new coal plants does not make sense from a health perspective and may not make sense from an economic point of view. If capacity is being expanded to meet export demand, this assumption should be carefully reviewed. Recent European electricity developments suggest there is a limited market for exported electricity in the EU. Ultimately, the Western Balkans might find itself becoming a dumping ground for unhealthy energy projects with plants that are stranded assets.

→ **Take into account health protection and opt for renewables and energy savings**

Every energy form comes with risks (and possible benefits) for health. When deciding on energy choices, the health cost and the health consequences for future generations need to be considered as a priority. Policy-makers should also be aware of the

European and global trend on decarbonisation. The EU as a whole is turning to renewables, and coal power is on a downward trend. Since 2000, the share of renewables in power generation in the EU has risen fourteen fold, from 1 to 14 percent, and is expected to grow further.

In addition, replacing fossil fuel capacity with renewable energy sources would help to align policies and infrastructure with the EU energy roadmap. This would make a positive contribution in the EU accession process and could lessen transitional challenges. In addition, the Western Balkan countries could make an important contribution to reducing air pollution, protecting public health and the environment, reducing environmental health inequalities, and tackling climate change.

→ **Fulfil the obligations and fully implement standards agreed in international treaties, such as the Energy Community, Kyoto protocol and Paris Treaty 2015**

Fulfil obligations and fully implement standards committed to by signing international treaties, such as the Energy Community and Kyoto protocol. National governments need to take their responsibilities seriously and show leadership in global de-carbonisation processes, which Western Balkans leaders agreed should finish by mid-century when they signed the recent Paris Treaty on climate change (2015). This will demonstrate public health benefits and cost savings.

WHAT DOES THE WHO RESOLUTION SAY?

The World Health Organization's Resolution on the health impact of air pollution was agreed during the 68th World Health Assembly in Geneva (18-26 May 2015). It is the first-ever resolution agreed by WHO on air quality and urges member states to redouble efforts to identify, address and prevent health effects of air pollution. WHO is called upon to help countries implement the WHO air quality guidelines. The resolution indicates that health ministers are aware that phasing down fossil fuels to promote air quality is "a priority to protect health and provide co-benefits for the climate, ecosystem services, biodiversity, and food security" and "that promoting energy efficiency and expanding the use of clean and renewable energy can have co-benefits for health and sustainable development". The resolution also stresses "that the affordability of this energy will help maximize these opportunities". The World Health Organization is expected to adopt a Roadmap to implement the resolution during its May 2016 session.

→ **Align national laws with WHO recommendations and fully implement existing air laws to take responsibility for providing clean air for the national population to breathe**

The Western Balkan countries have national air quality standards for air pollutants but implementation is falling behind. Authorities should fully implement these laws. They should address the WHO resolution on air quality and align their standards to the levels recommended for health protection by WHO. They should also adopt national emissions reduction plans that take into account health damage from coal plants in the region and in the Europe. This will demonstrate public health benefits and cost savings.



TO EU DECISION-MAKERS

THEY SHOULD >>>>>

→ **Pull their weight on air quality and pollution control in the Western Balkans EU accession process**

The Western Balkan countries are all candidates for becoming members of the EU, with accession negotiations currently taking place. EU decision-makers need to encourage the Western Balkans towards a comprehensive alignment and application of EU environmental standards, particularly high standards on air quality in the short term. Staying strong on air quality and pollution standards will bring greater health benefits in the short term and prevent additional compliance and administrative costs in the medium term.

→ **Push the Energy Community to include more stringent air quality laws and standards as soon as possible**

The Western Balkan countries are all members to the Energy Community, which aims to extend the EU internal energy market to South East Europe and beyond on the basis of a legally binding framework. The harmonisation of the energy market cannot happen at the expense of health and environmental protection. EU decision-makers should show leadership and insist on the inclusion of all parts of EU air quality legislation in the Energy Community's requirements and closely follow its application.

HEALTH PROFESSIONALS SHOULD SPEAK ABOUT THE UNPAID COSTS OF COAL

Health and medical professionals have a unique role to play in encouraging a transition from polluting to healthy forms of energy in the Western Balkan countries. They should initiate debates on the healthy energy options with the ministry of health, ministry of energy and other governmental institutions, as well with the public. Making widely known the true costs of coal power generation will help benefit public health.

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- ⁶ Figures for the other three countries in the Western Balkans are not available but are also likely to be high. Sources: For the data on premature deaths: Cost-benefit Analysis of Final Policy Scenarios for the EU Clean Air Package. October 2014. p. 48-49, <http://ec.europa.eu/environment/air/pdf/TSAP%20CBA.pdf>
- ⁷ Data from EEA AirBase v8 for 2012. Figures for Bosnia and Herzegovina for 2010. No data available for Kosovo
- ⁸ Due to insufficient data it is not possible to determine the exact share from coal power generation to air pollution emissions and concentrations for the Western Balkans as a whole. Where possible this share is given in the country sheets.
- ⁹ National emissions reported to the Convention on Long-range Transboundary Air Pollution (LRTAP Convention) database
- ¹⁰ https://www.energy-community.org/portal/page/portal/ENC_HOME/MEMBERS/PARTIES
- ¹¹ SEE Change Net (2013): Time to Phase Out Dirty Coal in South Eastern Europe: The Hidden Cost We Can Avoid
- ¹² The EU has already given some funding to retrofit plants.
- ¹³ Markandya A, Wilkinson P. (2007) Electricity generation and health. Lancet
- ¹⁴ The data here represents the emissions nationally or industry reported for 2013 or latest available, for further information see the box "Methodology at Glance".
- ¹⁵ This information was correct at the time of analysis for this report in November 2015.
- ¹⁶ More details of the health impacts and damage per coal unit are presented in the technical report of this publication and provide information for (re)evaluating the national and industry plans regarding coal-fired plants.
- ¹⁷ Health and Environment Alliance (HEAL): The unpaid health bill: How coal power plants make us sick (2013)

About HEAL

The Health and Environment Alliance (HEAL) is a leading European not-for-profit organisation addressing how the environment affects health in the European Union (EU). With the support of more than 70 member organisations, HEAL brings independent expertise and evidence from the health community to different decision-making processes. Our broad alliance represents health professionals, not-for-profit health insurers, doctors, nurses, cancer and asthma groups, citizens, women's groups, youth groups, environmental NGOs, scientists and public health research institutes. Members include international and Europe-wide organisations as well as national and local groups.



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