

# THE UNPAID HEALTH BILL

## How coal power plants in MACEDONIA make us sick



This factsheet which is part of a report by the Health and Environment Alliance (HEAL) entitled “The Unpaid Health Bill – How coal power plants in the Western Balkans make us sick” provides an assessment of the **health impacts and costs** associated with **air pollution** from **coal and lignite combustion at existing power stations in Macedonia**. It also estimates the costs for planned plants.

**The two existing coal power plants create up to 720 EUR million per year in annual health costs, of which 297 EUR million fall on the population within the region**

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 Macedonia create a total of between 109 and 297 EUR million per year** in health costs to people and governments in the region. **Due to long-distance travel of pollutants in the air**, plants in Macedonia are creating a total of between 265 and 720 EUR million health costs per year to Europe. Plants in Macedonia are generally operating on low environmental standards generating high levels of polluting emissions and high impacts on health.

### **Continued reliance on coal?**

Currently home to two existing coal plants with an installed capacity of 800 MW, Macedonia plans to install one new project with a 300 MW capacity. This would mean that Macedonia would continue to rely on the most polluting form of energy for many decades to come.

### **New coal plant could add health costs of up to 15 EUR million per year**

The new coal plant Mariovo would operate under much stricter air emission standards than current plants. However, it could create additional health costs for the population in the Western Balkan region of between two and six EUR million per year. This could create a total cost of between six and 15 EUR million per year to Europe.

**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 Macedonia.



# What are the unpaid health costs?

This country factsheet provides a monetisation of the health impacts of air pollution from coal power plants in Macedonia. We call these “unpaid costs” on human health because the health damage has to be borne by individuals, their families and society, and not by those responsible for the pollution.

Currently, Macedonia is home to two plants, Bitola and Oslomej, which are on average 30 years old, and generate electricity with a total capacity of 800 MW. By November 2015, the building of a new plant, Mariovo with an additional capacity of 300 MW was foreseen. 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 Macedonia.

## Calculation of the damage of coal power plants in Macedonia

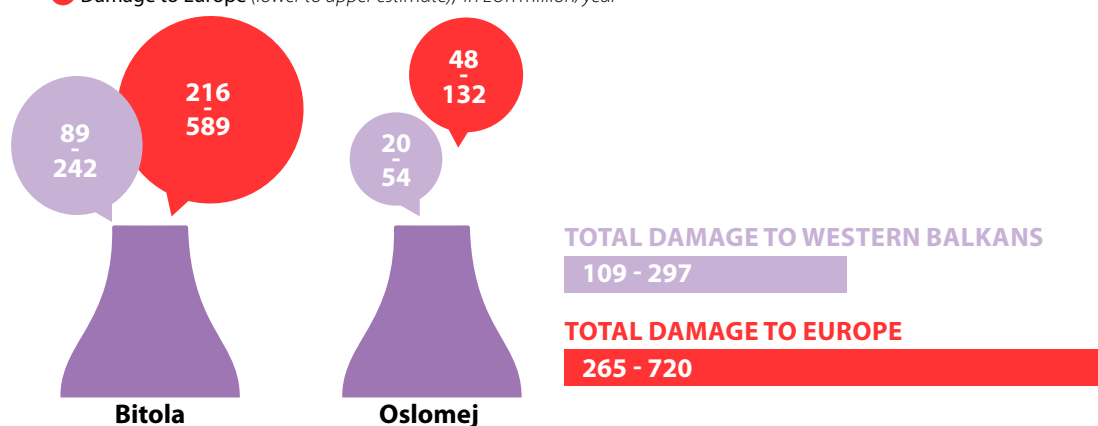
Research commissioned for this factsheet shows that coal plants in Macedonia are producing costs of between 109 and 297 EUR million in damages to the health of citizens in the region. The biggest plant and the most damaging to health is Bitola, which has three units. It is

causing an estimated 89 to 242 EUR million per year in health damage in the Western Balkans.

Damages to health by these two coal plants are causing between 265 and 720 EUR million per year to Europe. This is due to winds that carry coal fumes several hundred kilometres causing transboundary air pollution.

### The unpaid health bill for existing coal plants in Macedonia

- Damage to Western Balkans (lower to upper estimate), in EUR million/year
- Damage to Europe (lower to upper estimate), in EUR million/year



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.

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

The lower figure in the health costs presented here is an estimate based on one approach to the valuation of mortality: value of the loss of a year's life (VOLY), the higher figure is based on another approach: value of a

statistical life (VSL). These amounts are likely to be an underestimation because several health impacts as well as the full life cycle of coal are not factored in.

# What are the damages to health?

Figure 2 below shows the health damage from air pollution from coal power plants, with the most severe impact 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 impacts and costs from coal power generation in Macedonia

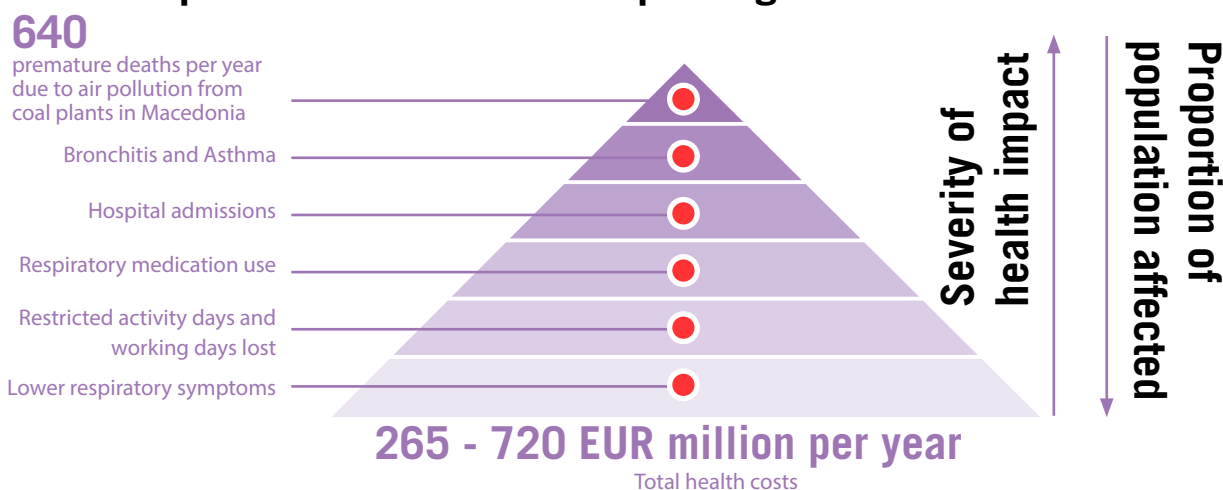


Figure 2. Factors contributing to total damages caused by coal plants in Macedonia

## Poor record on air quality

According to figures from the World Health Organization (WHO), the South East Europe (SEE) region is losing the equivalent of 19 percent of its GDP to costs associated with premature deaths from air pollution. In Macedonia, health costs associated with air pollution total 19.9 percent of GDP. These percentages are much higher than in Western Europe.<sup>1</sup>

Regarding air quality, in 2012, the annual mean levels of particulate matter  $PM_{10}$  in Macedonia hit a record among

Balkan countries, with an annual mean of  $87.6 \mu g/m^3$ . That is well over the limit values set by national law and considerably higher than WHO recommendations. In 2011, the annual mean of  $PM_{10}$  was even higher with  $96.5 \mu g/m^3$ . The limits for fine particulate matter  $PM_{2.5}$  were exceeded by 2.5 times, with an annual mean of  $51.4 \mu g/m^3$ .

Macedonia experienced more than two months (129 days) of high levels of  $PM_{10}$  in 2012. This means citizens in the country were breathing highly polluted air for more than four months, instead of one month, which is the limit set by the national law to protect public health.

### Air quality in Macedonia harms health

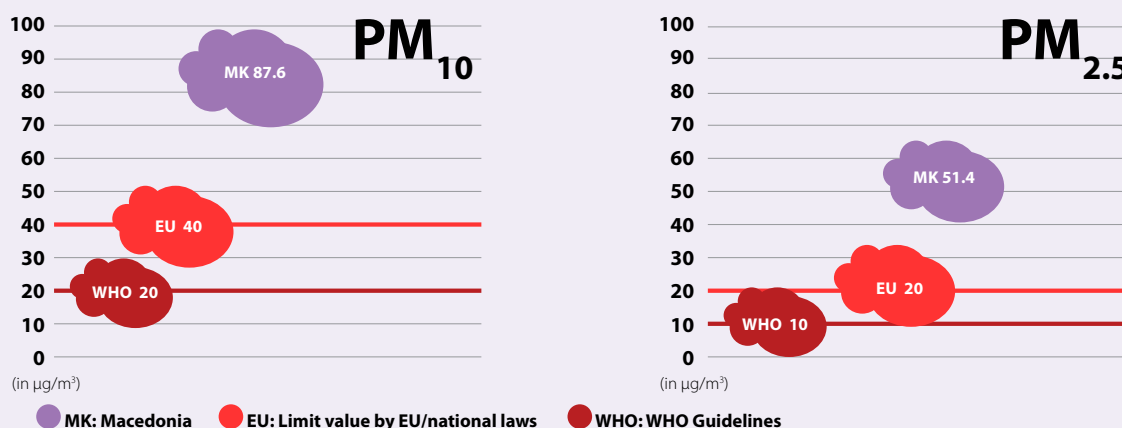


Figure 3. Annual mean concentrations of  $PM_{10}$  and  $PM_{2.5}$  in Macedonia, and limit value set by national laws/ EU and WHO guidelines



“In Skopje, Macedonia, a 12 percent increase in cardiovascular diseases was found with every 10 µg/m<sup>3</sup> increase of PM<sub>10</sub> above daily limit levels. Authorities in Macedonia need to introduce special measures and programmes to reduce emissions that cause ambient air pollution with PM<sub>10</sub>. If this does not happen, the country will continue its trend of low air quality for a longer period of time”

Professor Dr. Mihail Kochubovski, Institute of Public Health of FYR Macedonia

## Coal power dependency and its contribution to air pollution in Macedonia

Emissions from coal power plants make an important contribution to poor air quality<sup>2</sup>. Each year, one large coal power plant emits thousands of tonnes of hazardous air pollutants including heavy metals. Pollutants such as sulphur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>) react in the atmosphere to form ozone and secondary PM. Ozone and PM are of greatest concern to health.

In Macedonia, the two existing coal plants were responsible for more than 92 percent of national SO<sub>2</sub> emissions and the source of almost half of NO<sub>2</sub> emissions in 2013<sup>3</sup>. Coal plants are also significant contributor to national PM emissions.

Macedonia has a relatively small electricity system in the region with around 77 percent of electricity generated from coal and lignite<sup>4</sup>. The average age of four coal fired units is 30 years. The Bitola unit 1 plant is the oldest; it has been in operation for the past 34 years. Bitola has three units with a total capacity of 675 MW. The other existing plant is Oslomej with a 125 MW capacity.

## Bitola – one of the most polluting coal plant in Europe

Although Macedonia has only two plants, one of them is the most polluting plant in Europe. Bitola is among the top 10 polluters for PM<sub>2.5</sub> and SO<sub>2</sub>.<sup>5</sup>

### Meet the ten most polluting coal power plants in Europe

**PM<sub>2.5</sub>**



**SO<sub>2</sub>**



Coal-fired power plants in Europe emitting the greatest quantities of PM<sub>2.5</sub> and SO<sub>2</sub>



# New plants would only add to the health burden

Macedonia has announced the building of one new coal project - Mariovo. For the time being, it is only included in the Draft revised Energy Strategy 2015-2035 and further steps have not yet been taken since it is projected that it would start its operation after 2030 once the Bitola plant is retired.

If Mariovo was operating, health costs could total up to 15 EUR million per year for Europe, including a total of between two and six EUR million per year for the Western Balkans countries.

## The unpaid health bill for future coal plants in Macedonia



New coal plants need to be compliant with EU legislation. That is good news for health. It means they must use “best available technologies” to filter the pollution from the air thus emitting less pollution into the environment. Macedonia’s obligations to comply with strict air emission standards is a result of its membership of the Energy Community, an international organisation dealing with energy policy.

Macedonia has binding national targets to achieve 28 percent of its energy through the use of renewables by 2020<sup>9</sup>. This should involve the phase out of coal and opting for renewables, which is the healthy and sustainable way ahead.

## The way forward: healthy energy choices

### **POLICY RECOMMENDATIONS TO DECISION-MAKERS IN MACEDONIA** **THEY SHOULD >>>>>**

→ **Rapid phase out of coal: Close all old coal-fired plants and do not build new ones;**

HEAL considers that a phase out of coal power generation for the EU is possible by 2040. Macedonia should achieve the decarbonisation of the power sector in about the same time frame.

→ **Take into account health protection in all energy decisions and opt for renewables and energy savings;**

→ **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, and;**

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

### **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 Macedonia. They should continue 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.

## References

- <sup>1</sup> WHO Regional Office for Europe, OECD (2015). Economic cost of the health impact of air pollution in Europe: Clean air, health and wealth. Copenhagen: WHO Regional Office for Europe.
- <sup>2</sup> Due to insufficient data it is not possible to determine the exact share from coal power generation to air pollution emissions and concentrations.
- <sup>3</sup> Data under the Convention on Long-range Transboundary Air Pollution (CLRTAP) for Macedonia for 2013
- <sup>4</sup> [https://www.energy-community.org/portal/page/portal/ENC\\_HOME/MEMBERS/PARTIES](https://www.energy-community.org/portal/page/portal/ENC_HOME/MEMBERS/PARTIES)
- <sup>5</sup> Data on emissions for existing plants is from E-PRTR database year 2013 for EU and Serbian plants, for other plants data on emissions see Methodology at Glance section of full report.
- <sup>6</sup> [https://www.energy-community.org/portal/page/portal/ENC\\_HOME/AREAS\\_OF\\_WORK/Obligations/Renewable\\_Energy](https://www.energy-community.org/portal/page/portal/ENC_HOME/AREAS_OF_WORK/Obligations/Renewable_Energy)

## 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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