



# Executive summary

Having been on a downward trend for decades, the use of coal in power generation in Europe is on the rise again. Coal is still a major energy source in Europe, accounting for approximately one fourth of electricity production. Around 50 new coal power plants are currently in the pipeline. But the continued reliance on coal comes with a price that decision makers are hardly aware of: the unpaid health bill. This health bill is paid by individuals, national health care budgets, and by the economy at large due to productivity losses.

How is coal pollution making us sick? Coal power plants are an important contributor to air pollution in Europe, which European respiratory experts have called an 'invisible killer' and one of today's most important public health threats. Exposure to outdoor air pollution is linked to a number of health impacts including higher rates of respiratory and cardiovascular disease. This report developed by HEAL aims to provide:

- An overview of the scientific evidence on how air pollution impacts health and how emissions from coal power plants are implicated in this;
- The first ever economic assessment of the health costs associated with air pollution from coal power plants in Europe;
- Testimonies from leading health advocates, medical experts and policy makers on why they are concerned about coal, and;
- Recommendations for policy-makers and the health community on how to address the unpaid health bill.

## The main findings

Emissions from coal power plants in Europe contribute significantly to the burden of disease from environmental pollution. The brand-new figures published in this report show that European Union-wide impacts amount to more than 18,200 premature deaths, about 8,500 new cases of chronic bronchitis, and over 4 million lost working days each year. The economic costs of the health impacts from coal combustion in Europe are estimated at up to €42.8 billion per year. Adding emissions from coal power plants in Croatia, Serbia and Turkey, the figures for mortality increase to 23,300 premature deaths, or 250,600 life years lost, while the total costs are up to €54.7 billion annually. These costs are mainly associated with respiratory and cardiovascular conditions, which are two important groups of leading chronic diseases in Europe. Together, coal power plants in Poland, Romania and Germany are responsible for more than half of the total health impacts. Substantial impacts are further attributed to coal combustion in Bulgaria, Czech Republic, France, Greece, Serbia, Turkey, and the United Kingdom.

## Outdoor air pollution: a major risk factor to health

There is a large body of scientific evidence consolidating the various health effects of air pollution, both in terms of premature mortality and acute as well as chronic ill-health. Although outdoor air quality in Europe has improved over the years, outdoor air pollution is still a major public health threat.

The European Environment Agency (EEA) estimates that 80-90% of the urban population in Europe is currently exposed to levels of particulate matter and ozone that are higher than recommended by the World Health Organization (WHO). Although coal power plants are only responsible for a small portion of total outdoor air pollution, they are the most important source of industrial air pollution. A large coal power plant emits several thousand tons of hazardous air pollutants every year and has an average lifetime of at least 40 years. Building new coal power plants would mean that hazardous emissions and their effects on health would continue for many years. It would also counterbalance short-term reductions in air pollutants achieved in other sectors.

### **The two-fold burden on human health: air pollution and climate change**

Coal power generation is furthermore a major contributor to climate change, which was recognised by the Director-General of the WHO as the major public health challenge of the 21st century. Coal is the most carbon-intensive energy source in the EU, contributing approximately 20% of total greenhouse gas emissions. Evidence is growing that Europe already experiences health impacts from climate change, and scientific models project alarming increases in morbidity and mortality over the coming decades. While a phase out of coal in electricity and heat generation in Europe is a prerequisite for preventing long term health impacts from climate change, it will also benefit people's health in the short term due to lower air pollution.

### **Top health concerns**

Coal power generation adds to already poor outdoor air quality in Europe - caused mainly by the transport sector, industrial processes, residential heating, and agriculture. Coal power plants release substantial amounts of particulate matter, sulphur dioxide, and nitrogen oxides - the latter contributing indirectly to the formation of ozone. Of these, the most worrying for health are fine particulate matter (PM<sub>2.5</sub>) and ozone. Because pollutants can travel over long distances and across borders, the whole European population is affected by coal pollution, dispersed in outdoor air.

Significant evidence exists on how long-term exposure to these air pollutants affects the lungs and the heart. They include chronic respiratory diseases, such as chronic bronchitis, emphysema and lung cancer, and cardiovascular diseases, such as myocardial infarctions, congestive heart failure, ischemic heart disease and heart arrhythmias. Acute effects include respiratory symptoms, such as chest tightness and coughing, as well as exacerbated asthma attacks. Children, older people and patients with an underlying condition are more susceptible to these effects. Recent research suggests that air pollution may also result in low birth weight and pre-term delivery as a result of maternal exposure during pregnancy.

Other hazardous substances emitted from the smokestacks of coal power plants are heavy metals, such as mercury, and persistent organic pollutants (POPs), such as dioxins and polycyclic aromatic chemicals (PAHs). These can either be breathed in or taken up indirectly via food and water. Special concern arises from the large mercury emissions from coal power plants as mercury can impair the cognitive development of children and cause irreversible damage to vital organs of the foetus. Coal power plants are the most important source of mercury in Europe, and the EU is addressing technical options to reduce these emissions within the framework of a new UN treaty.

## **A breath of fresh air: what needs to be done**

From a health perspective, building new coal power plants would work against efforts to tackle chronic disease, create substantial costs for public health and lock in hazardous emissions for decades. The external costs to health from coal power generation have been missing from the debate on the future of Europe's energy mix. These costs should be taken into consideration in all future energy investment decisions. Conversely, claims that domestic coal represents a cheap energy source need to be urgently revised.

Given the urgent need to tackle climate change and the substantial health risks related to air pollution, a phase out of coal in power generation is imperative on health grounds, with a moratorium on new coal power plants as a first step. Many EU Member States are struggling to meet air quality standards and plans to construct new coal power plants would threaten their progress in curbing air pollution. Instead, investments in renewable energies and energy savings should be prioritised. They have the potential to secure large health co-benefits, both in the short and long term.

## **How medical professionals and public health experts can advocate for a phase out of coal**

Health and medical experts are becoming increasingly concerned about air pollution and the role of coal combustion in it, and they have continuously highlighted the enormous health risks of climate change. In October 2011, over 500 health and security experts, including medical associations, leading medical research institutes and public health organisations, called on governments to ban the building of new coal-fired power plants without Carbon Capture and Storage (CCS) technology, and to phase out the operation of existing coal-fired plants, starting with lignite plants due to their most harmful effects on health.

Public health experts and medical professionals can play a vital role, especially at the national and local level, in making the phase out of coal a reality. They can draw on the scientific evidence presented in this report to highlight the role of coal in air quality and climate change discussions. In addition, three annexes of this report contain specific information that can be used to advocate for better health protection: a technical report, method for the impact assessment; an overview of the most harmful pollutants originating from coal power plants and their associated health risks; and a tool box on how to apply EU environmental laws to tackle coal pollution.

The engagement of public health experts will be crucial to ensure that the unpaid health bill is taken into account in future energy decisions.